THE EFFECT OF DIRECTED IMAGERY
ON THE ATTENTION OF FIFTH GRADERS

By

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TABLE OF CONTENTS

Page

ACKNOWLEGEMENTS ii

LIST OF TABLES. v

ABSTRACT. vi

CHAPTERS

I INTRODUCTION 1

Rationale for the Study. 8
Statement of the Problem 10
Definition of Terms. 11
Organization of the Remainder of This Study. 11

II REVIEW OF THE LITERATURE 12

Rationale for Utilizing Imagery Therapies. 12
History of Imagery 19
Contemporary Imagery Therapies 28
Other Applications of Imagery. 38
Imagery in Education 43
Imagery Research in Education. 47
Imagery and Attentional Behaviors of Elementary School Children 51
Summary. 55

III METHODOLOGY. 57

Subjects 57
Hypotheses 59
Design of the Study. 60
Selection of the Target Behaviors. 62
Development of the Imagery Tapes 63
Development of the Academic Imagery Tapes. 64
Development of the Nonacademic Imagery Tapes. 66
Instrumentation. 67
Subject Questionnaire. 72
Analyses of Data 72

IV ANALYSES AND RESULTS 74

V SUMMARY, DISCUSSION OF RESULTS, CONCLUSIONS, IMPLICATIONS, LIMITATIONS, RECOMMENDATIONS. 80

Summary. 80
Discussion of Results. 83
Conclusions. 88
Implications for Classroom Application . . 89
Limitations of the Study 92
Recommendations for Further Research . . . 94

APPENDICES

A LETTER TO THE FIFTH GRADE TEACHERS 96

B PARENTAL CONSENT FORM. 97

C DIRECTIONS FOR COUNSELORS. 100

D SCRIPT FOR THE ABBREVIATED RELAXATION EXERCISE 102

E SCRIPTS FOR THE ACADEMIC IMAGERY TAPES . . 104

F SCRIPTS FOR THE NONACADEMIC IMAGERY TAPES. 114

G THE MARATHON MATH ACTIVITY BOOKLET 125

H INSTRUCTIONS FOR THE ADMINISTRATION OF THE MARATHON MATH ACTIVITY (MMA) PRETEST AND POSTTEST 138

I SUBJECT QUESTIONNAIRE. 140

REFERENCES. 141

BIBLIOGRAPHICAL SKETCH. 154

LIST OF TABLES

TABLES Page

1 SUMMARY OF ANALYSIS OF VARIANCE. 76

2 PRETEST TO POSTTEST COMPARISONS. 77

3 PERCENTAGE OF SUBJECTS RESPONDING AFFIRMATIVELY ON SUBJECT QUESTIONNAIRE . . 79

Abstract of Dissertation Presented to the Graduate School
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THE EFFECT OF DIRECTED IMAGERY ON THE ATTENTION OF FIFTH GRADERS

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This study investigated the effects of directed academic imagery on the attention (and four related variables) of fifth grade students perceived as having attending problems by their teachers.

A total of 57 fifth graders at six elementary schools were randomly assigned to the following experimental groups: (a) directed academic imagery; (b) directed nonacademic imagery; and (c) no treatment.

During the first week of this nine week study, the names of prospective subjects were solicited from all fifth grade teachers at the six schools.

During the second week of the study the teachers rated the children they referred on the "Poor Attention," "Poor Impulse Control," and "Poor Academics" scales of the Burks' Behavior Rating Scale. Those children falling within the "significant" range on the "Poor Attention" scale were selected to participate in the study.

During the third week of the study the children selected to participate completed the Piers-Harris Self-Concept Scale and were administered a pretest involving the computation of simple arithmetic problems.

From the fourth through the eighth week, subjects in the treatment groups received one treatment session per week. One treatment group listened to audio tapes involving the directed imagery of academic behaviors, while the other group listened to audio tapes involving nonacademic themes. Subjects in the no treatment group were not exposed to the tapes.

During the ninth week posttest data were collected. Subjects in the treatment groups also completed a questionnaire designed to elicit their feelings concerning the treatment.

Comparisons of pretest and posttest ratings on the Burks' Behavior Rating Scale indicated that the attention of the subjects was significantly and positively influenced for the group receiving academic imagery, but not for the group receiving nonacademic imagery or the no treatment group. Significant results were not obtained on any of the other measures.

It was concluded that the presentation of academic imagery positively affected the attention of the students participating in this study as perceived by their teachers. Possible explanations for failure to obtain significance on the other measures were also discussed.

CHAPTER I
INTRODUCTION

The role of the school psychologist is a highly varied one and includes not only the popular conception of evaluation, diagnosis, and the development of treatment recommendations, but also the function of consultation with teachers, counselors, principals, and parents. Consultation is a very important aspect of the school psychologist's role, as it can serve to modify problematic behavior within the regular classroom and avoid the possibility of special education placement in many instances.

The consultation scenario usually involves the psychologist meeting with a teacher to discuss a problem he or she is having with a particular child. An indepth discussion follows in which the problem is reviewed and an intervention strategy is developed by the teacher and psychologist to be implemented in the regular classroom.

One of the most frequently reported problems by public school teachers is that of poor attention on the part of their students (Hewett & Taylor, 1968). Goodman (1978) further substantiates this concern and suggests that the inability to attend to academic tasks for a sufficient length of time is a primary reason children do poorly in school. The purpose of the present study is to attempt to develop an intervention which public school personnel might use to improve the attending skills of elementary school children.

A variety of techniques have been employed to help in ameliorating attentional problems. Cruickshank, Bentzen, Ratzenburg, and Tannhauser (1961) suggested a structured program, stimulus reduction, and enhancement of the intensity of teaching materials to help a child who exhibits attending deficits. A structured program is one which is almost completely teacher directed, the rationale being that the highly distractable child cannot make his or her own decisions. Stimulus reduction involves sound proofing, cubicles, carpeting, opaque windows, enclosed bookcases and cupboards --anything to reduce potential distractions within the child's educational environment. Studies by Gorton (1972) and Sommervill, Warnberg, and Bost (1973) have established the effectiveness of stimulus reduction in improving the academic performance of children with attentional problems. Stimulus enhancement involves increasing the impact and vividness of instructional materials. Bousfield, Esterson, and Whitmarsh (1957), for example, demonstrated that words accompanied by descriptive, colorful pictures were more frequently recalled by children than were words presented alone.

Modeling, which involves the use of peers or adults to demonstrate to the distractable child appropriate attending behaviors, has been demonstrated to be a powerful therapeutic technique (Collins, Dansereau, Garland, Holley, & McDonald, 1981; Epstein, Hallahan, & Kaufman, 1975). Self-instruction is often combined with modeling in working with children with behavioral problems. The purpose of self-instruction is to help the child to develop verbal control of behavior. Meichenbaum (1975) described a four-step process to develop self-instruction. Initially, a child observes an adult perform a task while talking to him or herself out loud. Next, the child performs the same task under the direction of the model. The child is then encouraged to whisper instructions to himself as he performs the task while guiding his performance through private speech.

The research has shown behavior modification to be useful in working with distractable and hyperactive children. Frank Hewett (1967) has clearly demonstrated in his Santa Monica project that tokens and check marks which could be exchanged for candy and trinkets were effective in developing attending skills in distractable children. Shutte and Hopkins (1970) and Kazdin and Klock (1973) have demonstrated that praising and rewarding a child for paying attention will reduce nonattentive behaviors.

Hewett and Taylor (1968) discussed a variety of tactics for getting distractable children to pay attention to the teacher when verbal directions are being given. These include speaking softly and using simple terms, one-to-one instruction, an "attention mask" which the teacher wears, an "attention wand" the teacher utilizes to point out important aspects of the educational environment, the use of hand puppets to give directions, and having students use mirrors to view the teacher at the back of the room. Other professionals have recommended the use of stimulant drugs such as Ritalin in reducing hyperactivity and increasing attending skills (Conners, 1971; Sroufe, 1975).

Although these techniques have been demonstrated to be effective, frequently they do not easily lend themselves to the school setting because they require a great deal of teacher knowledge and participation to ensure effectiveness.

Another therapeutic technique for changing behavior is that of directed imagery, which involves encouraging an individual to actively engage in the mental production of suggested sensory experiences. Directed imagery was first reported as a psychotherapeutic technique by Freud in the late nineteenth century (Kelly, 1972). The technique has since been modified and expanded upon by many therapists in an effort to effect positive cognitive and behavioral changes. Possibly one of the most popularized application is that of "systematic desensitization" formalized by Wolpe (1958). Systematic desensitization is a technique designed to treat phobias and involves initially teaching a person to relax, after which he is slowly and progressively moved through a graded hierarchy of anxiety producing scenes such that relaxation rather than anxiety predominates.

More recently, Cautela (1977) has developed imagery therapies based on operant conditioning paradigms. He calls one such technique "covert positive reinforcement." The client is first trained to generate imagery of a pleasant activity (e.g., skiing down a snow covered mountain slope). During the treatment phase, the patient is asked to imagine performing a desired response, and then shift to the pretrained reinforcing image. As with positive reinforcement in operant conditioning, in which a tangible reinforcer is utilized to increase the frequency of a desired response, it is theorized that the imagined reinforcer in covert positive reinforcement has the similar effect of increasing the frequency of occurrence of the response it follows. Other techniques developed by Cautela include "covert sensitization," "covert extinction," "covert response cost," and "covert modeling."

Another application of directed imagery is that of guided fantasy (Crampton, 1969; Halpren, 1964; Kelley, 1972; Leuner, 1969). Guided fantasy involves placing a client in a special state of relaxation and encouraging him to utilize his active imagination to follow therapist selected content (Anderson, 1975/1976). Such themes as a trip through the body, walking through the forest, or walking along the beach have been utilized in guided fantasy sessions.

Directed imagery techniques appear to offer a number of advantages over some of the more traditional psychotherapeutic and behavior management techniques. Research in the area of directed imagery indicates that the procedure can be a nonthreatening way to approach new and potentially difficult behavior (Crampton, 1969; Kelly, 1972; Leuner, 1969; Wolpe, 1973). Cautela (1973) emphasized a number of advantages in the use of imagery techniques: (a) the use of imagery requires little, if any, equipment and the procedures can be applied in almost any setting; (b) directed imagery techniques are not limited to the temporal, economic, or other practical restraints of reality imposed upon many other forms of therapy; and (c) imagery can easily be used as a self-control technique, enabling the patient to engage in self-application outside the clinical setting.

Directed imagery techniques have been found to offer advantages particularly with respect to the public school setting. Kelly (1972) stated that imagery techniques appear to be especially appealing to young children and adolescents. Researchers have found that almost all children engage in imagery as a "preverbal" mode of coding information, which seems to serve the same purpose for children as words do for adults (Bruner, 1966; Church, 1961; Vygotsky, 1962). Siipola and Hayden (1965) reported that the ability to form images bears no relationship to intelligence, as they have found striking examples of imagery in mentally retarded children.

Rationale for the Study

Directed imagery techniques not only appear to offer advantages over other psychotherapeutic and behavior management techniques, but furthermore seem to lend themselves well to the public school setting. Jones (1968) and Wittmer and Myrick (1980) suggested that imagery is a powerful tool for facilitating academic instruction and developing cognitive and motor skills. The potential for such applications in the schools is further supported by research findings demonstrating the effectiveness of imagery in facilitating reading comprehension (Bossenbroek-Schipper, 1979/1980; Pressly, 1976); memory (Levin, Guttman, & McCabe, 1977); spelling (Caban, 1978); effortful academic behavior (Edenfield, 1979); control of aggressive behavior (Anderson, 1975/1976); and control of inappropriate behaviors of a hyperactive child (Workman & Dickinson, 1979). These studies are discussed in detail in Chapter II, Review of the Literature.

From the research it seems clear that imagery can facilitate a variety of academic tasks and school related behaviors. The literature contains little on the effects of directed imagery techniques on attentional behaviors of elementary school students. Workman (1977) attempted to investigate the effects of covert positive reinforcement on the on-task behaviors of fourth, fifth, and sixth graders; however, the results of the study were inconclusive. Edenfield (1979) demonstrated that directed positive imagery increased the accuracy and number of problems completed on a specific academic task performed by fifth graders. Brackett (1979) described a guided fantasy technique which she calls "The Concentration Box." When used consistently, it is reported to improve attention span and concentration in elementary school children; however, no data are presented to support this contention.

This study was designed primarily to investigate the effects of a directed imagery technique on the attentional behaviors of elementary school children who were experiencing difficulties attending in the classroom. The study was also designed to investigate the effects of directed imagery on variables which appear to be related to attentional behaviors. The effect of treatment on the impulsivity of these children was studied since many experts include impulsivity as a concomitant with attending problems in the definition of "attention deficit disorders" (Burks, 1983; Goldenson, 1984). Improved attending skills and reduced impulsivity might result in improved academics, which in turn could positively affect self-concept. Thus, the effect of the direct imagery technique on the academic behaviors and self-concept of these children was investigated. Finally, because the measurement of changes in the target variables as a result of treatment in this study relied on teacher ratings and self-referent data, the effect of directed imagery on an academic task requiring sustained attention was included to lend a more objective measure of the treatment effect.

Statement of the Problem

The research questions tested experimentally in this study were (a) can the presentation of a directed imagery technique positively affect the attention, impulsiveness, and academics of elementary school students as perceived by their teachers, (b) can the presentation of a directed imagery technique positively affect the performance of these children on an academic task requiring sustained attention, (c) can the presentation of a directed imagery technique positively affect the self-concept of these children?

Definition of Terms

Academics. The basic school subjects.

Attentional Behaviors. The conscious and deliberate focus of attention upon the required academic task whether it be sustained seatwork or attending to the teacher during lecture periods.

Directed Imagery. A technique whereby a subject is verbally encouraged to actively engage in the production of imagery, the content of which is suggested by the therapist.

Imagery. The conscious mental production of perceptions of sensory experiences of persons, places, objects, or events no longer present to sensory receptors.

Impulsivity. The inability to delay responses in an appropriate manner (Burks, 1983).

Organization of the Remainder of This Study

The remainder of this study is organized into four additional chapters and the appendices. Chapter II includes a review of the literature concerning directed imagery. Chapter III contains the methodology including the design of the study and treatment conditions. The results are reported in Chapter IV. Chapter V includes a summary and discussion of the results, as well as recommendations for further study.

CHAPTER II
REVIEW OF THE LITERATURE

Rationale for Utilizing Imagery Therapies

The study of imagery played an important role in the field of psychology in American until the behavioristically inspired moritorium on all unobservable mental events in the 1920s. Interest in imagery remained underground and virtually disappeared before reemerging in the 1960s (Klinger, 1981). In the past two decades since then, the use of imagery techniques has proliferated. They are now utilized by therapists specializing in areas as diversified as traditional behaviorism (e.g., Wolpe's systematic desensitization, 1973); psychodynamically oriented therapies (e.g., Shorr's psycho-imagination therapy, 1972); and physiologically oriented interventions (e.g., biofeedback).

Therapeutic imagery techniques involve utilizing an individuals capacity to fantasize and daydream to bring about more positive cognitive and behavioral changes. Richardson (1982) reported that, although many professionals and laymen alike dismiss daydreaming as a waste of time, this endeavor is in fact a powerful therapeutic tool.

According to Klinger (1981) daydreaming and imagining are natural processes central to human functioning and perception. Many theorists contend that in order for perception, or understanding, to occur, the brain must construct and store models of the world so it can later compare them with new sensory input. It is these models or images which allow an individual to make meaningful sense out of sensory input. For example, Lazarus (1977) contended that the behavioristic "stimulus-response" model of human behavior is limited in its ability to explain behavior, because individuals respond differently to the same stimuli. The model does not account for these differences. Lazarus suggests that an image, or a series of images, bridges the gap between a stimulus and a response. Events are transposed into images, and these images, which are highly idiosyncratic, govern the individuals responses. With this in mind, Lazarus contends that many seemingly inexplicable stimulus-response connections begin to make sense.

Imagery also plays a central role in Jean Piaget's (1952) theory of cognitive development. In Piaget's model, a child moves through four stages of development which become successively more sophisticated. Initially, a child is limited to active motoric interaction with the environment. At approximately 18 months of age the child begins to form internal representations, or images of his or her world known as "schemata." These "schemata" form the basis upon which future understandings are built, expectations established, and to which new inputs are matched. As a child grows, schemata are modified and new ones are formed through the process of "assimilation" and "accommodation." The process of assimilation involves integrating newly encoded images into existing schemata. When new images fail to match old experience, the child "accommodates," or creates a new schemata.

Klinger (1981) argued that, if images play such an important role in human perception, then control over images constitutes control over a large part of an individual's psychic apparatus. Thus, working with an individual's images gives the therapist direct access to the processes necessary for change.

Aside from theory, there is experimental evidence supporting the contention that imagery can be a valuable therapeutic tool. Generally, the research suggests that images and actual perception are experientially and neuraphysiologically comparable (Klinger, 1981). For example, when looking alternately at black horizontal and vertical gratings on, respectively, blue and orange fields of color, there will be a color aftereffect, known as the "McCollough effect" (Shute, 1979). Klinger (1981) reported that when people are asked to imagine seeing black horizontal and vertical bars while looking at actual fields of unbroken color, they report the aftereffects of complementary colors.

Research has demonstrated that mental images produce low-level motor effects which are too weak to move effector organs but strong enough to be recorded electromyographically (Klinger, 1981). Suinn and Dickinson (1978) demonstrated electromyogram activity in a ski racer who was asked to imagine skiing a certain course. The activity recorded corresponded with the neuromuscular activity which would be expected if he had actually skied the course.

Other studies have demonstrated that images can arouse strong emotional activity similar to those that which would be elicited in the presence of the actual stimuli. For example, when people were asked to imagine scenes that were happy or enraging, they were left feeling either happier or angrier (Schwartz, Fair, Salt, Mandel & Klerman, 1976; Strickland, Hale, & Anderson, 1975).

Other studies have demonstrated the similar effects that images and perception have on the nervous system. Wooley and Wooley (1973) demonstrated that thinking about food is accompanied by salivation. Salivation is also elicited when a subject is asked to imagine that the tapwater he or she is drinking is sour (Barber, Chauncey, & Winer, 1964). Barber and Hahn (1964) demonstrated that imagining that one's arm is immersed in cold water when it is actually in water of room temperature increased heart rate and muscle tension. Jacobson (1930) showed that imagining lifting a weight with the right arm raises electromyographic activity in that arm. Simpson and Paivio (1966) have noted changes in pupil size during imagery sessions. Yaremko and Butler (1975) found that an imagined tone or shock produce habituation responses similar to those produced by real presentations of the stimuli. Other investigations have demonstrated that images can produce blood glucose increases, inhibition of gastrointestinal activity, increases in gastric-acid secretion, blister formation, and alternations in skin temperature (Barber, 1961, 1969, 1978).

King (1979) has developed a theory of conditioning to explain the similar effects that perceiving and imagining have on the nervous system. He contends that the act of perceiving a stimulus results in a temporary neural representation, which leads to a more permanent representation, or image, of the unconditioned stimulus. The image thus becomes a conditioned stimulus, and as in classical conditioning, obtains the power to affect behavior in the absence of the unconditioned stimulus.

Many professionals have reported advantages of imagery techniques over other types of therapies. Singer (1974) has found that imagery frequently opens new avenues of exploration when therapy seems to have come to a halt. Dave (1976) has found that when an impasse is reached in solving a problem in therapy, visualization of the elements in the problem is of greater benefit than employment of a rational-cognitive approach. Other therapists (Panagiotou & Sheikh, 1977; Reyher, 1963) have found that using "free imagery" (similar to free association) is very effective in circumventing the most stubborn defense mechanisms and uncovering repressed material. Guided daydreams have been found in many cases to produce therapeutic consequences in the absence of any interpretation by the therapist or intellectual insight on the part of the client (Desoille, 1961; Fretigny & Virel, 1968; Klinger, 1980; Leuner, 1977). Klinger (1980) and

Richardson (1969) have found that behaviors rehearsed at the imaginal level during therapy appear to generalize to situations outside therapy.

Sheikh and Jordan (1983) contended that, although language is probably the most common method of communication in the therapeutic relationship, language, when compared to images, has limitations. For example, Bowers and Bowers (1972) suggested that language forces an individual to exclude from consideration and even consciousness those aspects of our being that evade articulation. Schachtel (1959) argued that the inability of clients to comprehend various aspects of the therapeutic process is frequently the result of the encroachment of language upon the client's sensory and intellectual capacities. J. L. Singer and Pope (1978) contended that when events are coded into words they become abstracted and lose their immediate impact on the client. Hall (1977) theorized that much of our behavior is under control of those parts of the brain which are not concerned with speech. Bugelski (1970) and Forisha (1979) suggested that meaning in language is dependent upon images. Words arouse images that have accompanying emotional responses, and these emotional responses are the source of the meaning of words.

Other characteristics of images have been suggested which bear relevance to the therapeutic setting. Several psychologists contend that images are capable of representing situations or objects, and as such can act as motivators for future behavior (Miller, Galanter, & Pribram, 1960; Mowrer, 1977; Sarbin & Coe, 1972; Sheikh, Richardson, & Moleski, 1979). Tower and Singer (1981) proposed that individuals act more on the basis of imaginal consequences than actual probabilities. Relating specifically to children, studies on imagery have shown that children who engage in imaginative play when compared to those who don't show advantages in general positive emotionality, fluency of speech, persistence at tasks, ability to distinguish reality from fantasy, empathy and cooperation with other children, leadership, and the ability to resist temptation and tolerate delays (Shmukler, 1978; Singer, J. L. & Singer D. G., 1976, 1980; Smilansky, 1968).

History of Imagery

Imagery was first reported as a psychotherapeutic technique by Freud in the famous case of Anna O. (Breuer & Freud, 1895/1936). He, in fact, abandoned the use of hypnosis in favor of an imagery technique that was more thoroughly under the patient's conscious control. Freud developed a technique in which he would press on the patient's head and instruct him or her to observe images which appeared as he relaxed pressure. He discovered that patients would experience in rapid succession various scenes related to the central conflict. Freud later discarded this procedure because he believed that images were a form of resistance which stood in the way of free association and defended the client against unacceptable impulses. Thereafter he gravitated towards verbal methods including free association and dream analysis. This switch greatly influenced many psychoanalysts to come and resulted in an emphasis on the verbal content of the client's productions. Imagery came to be viewed by many as a primitive, primary-process function associated with regressive features and was downplayed in favor of directed, logical thought (Singer & Pope, 1978).

Nevertheless, a multitude of therapists continued to utilize directed imagery therapy in the clinical setting. Pierre Janet (1898) discovered that substituting one image for another was helpful in overcoming the "idees-fixes" of hysterical patients. This substitution technique is still utilized by many therapists (Crampton, 1974).

Alfred Binet (1922), although primarily interested in the study of intelligence, also developed a technique called the "dialogue method." Patients were encouraged to converse with visual images in an introspective state he called "provoked introspection." Both Janet and Binet believed that images which emerged during an introspective state revealed the clients diverse unconscious subpersonalities.

Jung (1928), unlike Freud, regarded mental images as a creative process of the psyche which could be utilized for attaining greater individual, interpersonal, and spiritual integration. Jung developed a therapeutic technique he called "active imagination." Jung believed that the unconscious was constantly dreaming. This process, however, generally goes unnoticed because an individuals attention is normally focused on the external. When a mental image is focused upon, it becomes enriched by details, moves, and develops. Jung contended that the unconscious would develop a series of images which would make a complete story (Jung, 1935/1976). Jung's "active imagination" technique focused on these images. He believed the technique was superior to dream analysis in "defeating" the unconscious and quickening maturation in analysis.

The first psychotherapeutic approach based largely upon the use of images was developed by Carl Happich (1932) in Germany. Happich expanded on Binet's work and induced "emergent images" by encouraging the client to engage in muscular relaxation, passive respiration, and meditation. He speculated that between the conscious and unconscious lies a "meditative" zone in which productions that have matured in the unconscious become visible to the conscious. Happich utilized a number of predetermined scenes (e.g., a chapel, a meadow, a mountain) to stimulate the emergence of these images which he felt to be psychotherapeutic. W. Kretschmer (1969) later investigated the significance of such scenes and incorporated them into his meditative psychotherapeutic technique.

Eugene Caslant (1921), a Frenchman, developed a technique for psychic development in which he encouraged clients to ascend or descend into imaginal space. Caslant discovered that during these movements, clients experienced many emotions and varying degrees of vividness of images. Caslant attempted to free his subjects from the normal constraints on the psyche using these ascending and descending images, and thus enable them to generate a creative form of imagery that might lead to self development (Singer, 1974).

Oskar Vogt, a brain physiologist who conducted research on sleep and hypnosis at the Berlin Institute between 1890 and 1900, noted that intelligent patients who had undergone many hypnotic sessions were able to place themselves into a mental state similar to a hypnotic state (Sheikh & Jordan, 1983). Vogt's patients noted that these "autohypnotic" experiences had a great recuperative effect and enhanced their general efficiency (Jordan, 1979). Schultz (1932) was stimulated by Vogt's work and began to investigate in 1905 whether hypnotherapy could be employed without developing in the patient the passivity and detrimental dependence on the therapist frequently associated with hypnosis. Schultz observed that patients experienced a feeling of relaxation, warmth, and heaviness in the extremities when in a state of hypnosis. He decided to encourage his patients to imagine they were having the same physiological experiences without inducing hypnosis. Schultz later developed this method into a therapeutic technique known as "autogenic training" in collaboration with Luthe (Schultz & Luthe, 1959).

Ludwig Frank (1910) discovered that the state of deep relaxation often resulted in the occurrence of hypnagogic images, which he believed to be cathartic in nature. Guillerey (1945) investigated the neuromuscular correlates of images and believed that the resolution of conflicts at an imagery level helped to bring about psychophysiological harmony.

The methods and investigations of Shultz, Frank, and Guillerey established the foundation for modern investigations and clinical uses of imagery (Sheikh & Jordan, 1983). Schultz's autogenic training, in particular, served as the forerunner of various modern methods of deep muscle relaxation combined with imagery techniques in behavior modification and has become a standard therapy in various fields of medicine in recent years.

Several French and German clinicians investigated the potential of fantasy for use as a primary method of psychotherapy during the behaviorist inspired American moritorium on the study of "inner experiences" of the 1930s and 1940s (Watkins, 1976). These techniques came to be known as "oneirotherapy" (from the Greek word "oneiros" meaning dream). Probably the most notable of these therapists was the Frenchman, Desoille (Crampton, 1974). Desoille developed a technique called "guided daydream" in which clients were prepared to meet anxiety-producing situations through structured daydreams (Desoille, 1938). His technique demonstrated that careful use of therapist directed daydreams could lead to increased self-understanding and emotional maturity (Sheikh & Jordan, 1983).

Other notable oneirotherapies included Fretigny and Virel's (1968) oneirodrama and Leuner's (1977, 1978) "guided affective imagery." Leuner's technique, which was developed through 20 years of experimental study, assisted the client in transposing regressive aspects of the personality into more mature modes of ego function, through highly systematized therapist techniques. Leuner developed 10 standard imagery situations to facilitate the exploration of presenting problems. Leuner concentrated on the emotions that were evoked during fantasy rather than the intellectual content.

The three most notable oneirotherapies mentioned above shared numerous elements. Generally, the individual is prepared for fantasy by creating conditions which help him or her relax. When necessary, preliminary training in muscular relaxation is given. All the orneiotherapeutic methods used extended visual fantasies in narrative form to obtain information about the motivational system of the client, including elements of conflict, perceptual distortion, self-perception, and early memories. The oneirotherapists utilize visual imagination along with associations, discussion, and interpretation. The client's verbalizations play an important role in discovering the meaning of his or her imagery, and emotional accompaniments of the images are discussed along with associated ideas and memories. These are all interpreted by the therapist. The therapist may assume directivity and may choose to introduce into the narrative helpful scenarios which do not occur spontaneously. Certain standard symbolic scenes that presumably reflect common areas of conflict can be presented to the client to initiate the process.

Onierotherapies are primarily psychodynamic approaches with respect to their assumptions. It is believed that the symbolism inherent in the visual images expresses the unconscious motives of the client without allowing them to fully impose on conscious recognition. Thus, it is hypothesized that the client will experience less resistance to the expression of the underlying motives for his actions. Fretigny and Virel (1968) claimed other advantages to the use of imagery therapies. They contended that (a) mental imagery is a useful tool with people who are incapable of systematic reflection due to their low level of sophistication, (b) through the use of imagery the problem of representing certain complex perceptions within the confines of verbal syntax are avoided, and (c) visual imagery facilitates the therapy of individuals who are predisposed to verbal rumination.

Another form of psychodynamically oriented imagery therapy is that of "psychosynthesis," developed by Roberto Assagioli, an Italian psychiatrist (Assagioli, 1965). His technique differed from the other psychoanalytic techniques of Freud, Jung, Desoille, Leuner, Fretigny, and Virel in that the goal of psychosynthesis is not only the investigation of unconscious motives, but also to thoroughly reconstruct the total personality, explore the various levels of personality, and eventually shift the personality to a new center (Singer, 1974). Assagioli's therapy utilizes several visual imagery techniques including symbolic visualization, guided daydreaming, active imagination, and a number of other "transcendence techniques" (Gerard, 1964). For example, in Assagioli's "dissolution of the body" exercise, a client is asked to imagine that his or her body is consumed in flames. As a result, the client is expected to experience a great sense of freedom and release, and an awareness that one's spiritual essence is independent of the body (Sheikh & Jordan, 1983).

Contemporary Imagery Therapies

The European clinicians discussed earlier are largely responsible for keeping imagery techniques alive during the behaviorist inspired moritorium in American psychology on the study of inner experience (Sheikh & Jordan, 1983). The return of interest in imagery in the United States, as Holt (1964) and Watkins (1976) observed, was inspired by studies outside the main stream of psychology. The studies were conducted by professionals in the field of engineering psychology (Holt, 1964), and those interested in the study of sensory deprivation (Hebb, 1960), and sleep and inactivity (Kleitman, 1963). American psychologists came to realize that they could utilize the research techniques developed by the behaviorists to investigate topics that had been discarded but were necessary to the understanding of human beings (Hebb, 1960). Ironically, it was the behaviorists who played a significant role in the resurgence of imagery techniques in America (Tower & Singer, 1981).

Many behavioristic procedures based on Pavlovian and Skinnerian models have been developed which demonstrate the ability of images to act as powerful stimuli. Joseph Wolpe (1958) was one of the first behaviorists to combine the elements of learning theory with the meditative and psychoanalytic techniques to develop one of the most popularized applications of directed imagery. Wolpe found that he could quickly alleviate irrational phobias by having clients imagine successively closer approximations to the object eliciting the fear while in a state of muscular relaxation. The procedure for systematic desensitization consists of four basic steps: (a) establishing a hierarchy of anxiety-producing stimuli; (b) training in progressive relaxation, (c) visualization of the least anxiety arousing stimuli while in a relaxed state until relaxation replaces anxiety, and (d) moving to the next scene in the hierarchy.

In systematic desensitization, images are generally used in lieu of the actual stimuli for practical reasons. Unlike the psychoanalytically oriented therapies, no symbolism is ascribed to the images.

Although Wolpe has commonly been given credit for the development of this method, references to the technique date back to 1922. For example, "counter conditioning" techniques (as it is also known) have been reported by Kretschmer (1922) who developed "systematic habituation therapy," and Howard and Patry (1933) who called their version "corrective habit training."

Lazarus and Abramovitz (1962) developed a variant of Wolpe's procedure to be used specifically with young children, and later extended it to use with adults. To enhance the effectiveness of the procedure with children, they utilized what they termed "emotive imagery" instead of relaxation to counter condition anxiety. This was done because Lazarus and Abramovitz were concerned that children might not readily learn deep relaxation. As with systematic desensitization, in "emotive therapy" a fear hierarchy is first established. The therapist then might, for example, determine who the child's favorite television, movie, or fiction hero is. The child is asked to imagine a therapist directed story in which the chosen character participates. The therapist gradually introduces successively more frightening objects into the story with which the hero deals successfully. Lazarus and Abramovitz (1962) reported using emotive therapy to deal effectively with phobias involving dogs, the dark, and school.

In contrast to systematic desensitization techniques, Stampfl and Levis (1967) developed "implosive therapy," in which the client is repeatedly exposed in imagery sessions to very intense fear stimuli in an attempt to arouse maximum anxiety. This technique is assumed to result in a gradual extinction of the fear response. In the absence of real aversive consequences, the anxiety is expectedly diminished.

Gardner (1971) developed a mutual story telling technique for children, which is based on overt modeling techniques developed by Bandura (1969). The child is encouraged to provide an initial story, and the therapist utilizes covert modeling by providing an alternative story in which the characters demonstrate alternative patterns of affect, behavior, and cognition. In order to increase the probability of a successful outcome, Gardner recommends that the models in the story have attributes and characteristics similar to those of the child. Gardner also recommends that the stories be rich in visual, auditory, and kinesthetic imagery. Gardner contents that this method is superior to merely telling a child how to behave, because the insights of adults conveyed through interpretations are frequently disguarded as false or silly. The child tends to give more serious consideration to the newfound understanding of a child in a similar situation (Gardner, 1971).

Joseph Cautela (1977) has developed a series of covert conditioning techniques that are based on operant and social learning procedures. His techniques include covert positive reinforcement, covert sensitization, covert extinction, covert response cost, and covert modeling. These methods differ from their operant conditioning and social learning counterparts in that both the behaviors and their consequences take place at the imaginal level.

For example, Cautela (1970) described a covert positive reinforcement procedure he utilized to help a doctoral student overcome extreme test anxiety which had caused him to flunk his doctoral qualifying exam three times. The first step in the procedure is to identify possible reinforcing stimuli. This can be accomplished through a reinforcement survey schedule, or by asking the patient to suggest pleasurable events or objects, or by soliciting information about possible reinforcing stimuli through case histories, relatives, and friends. A number of potential reinforcers are selected so that satiation does not occur.

After identification of possible reinforcing stimuli, the treatment phase is implemented. In the case of the doctoral student, although being an excellent student (as indicated by his grades and papers, semester examinations, and oral discussions) he suffered from extreme test anxiety and would become anxious and could not concentrate when attempting to study. Cautela began by working on the student's studying problem. With the patient relaxed and his eyes closed, Cautela would ask him to imagine himself sitting down and studying. The student was instructed to raise his finger when he was able to picture himself clearly in this situation. At this point, Cautela would state the word "reinforcement" which was the signal for the client to begin thinking of the imaginary reinforcer (in this case, the image of the client skiing down a mountain and feeling exhilarated). A similar process was utilized to help the student deal with the examination setting.

The patient was given the instructions to practice the entire sequence at home and was also told to vary the reinforcing stimulus to prevent satiation. After 10 sessions, the client took the doctoral examination for a fourth time, and reported that he had felt more confident and relaxed during the test, and that he had passed the exam (Cautela, 1970).

Sheikh and Jordan (1983) explain that Cautela's techniques are based on what he terms the "homogeneity assumption" (covert and overt events obey the same laws) and the "interaction assumption" (covert and overt events influence each other through interaction). Mahoney (1974) adds a third assumption, that of automaticity (conditioning occurs automatically when two events take place at the same time).

Meichenbaum (1977) has developed imagery based cognitive behavioral interventions, including "coping imagery" and "stress inoculation." In his therapies, Meichenbaum stresses the inclusion of self-talk, or private monologues along with the imaginal behavior. His therapy process involves three phases:
(a) increasing self-awareness in the client by encouraging the client to become an observer of his or her behavior, thoughts, feelings, physiological reactions, and interpersonal behaviors; (b) the patient learns new adaptive thoughts and responses that interfere with maladaptive ones; and (c) the client is encouraged to practice these new adaptive thoughts and response in reality.

The behavioristically oriented imagery therapists do not feel the need to posit a relationship between images and unconscious structures. Mental images are treated by the cognitive behaviorists as something akin to real events which are at times subjectively indistinguishable from their corresponding events in the real world (Sheikh & Jordan, 1983). This theoretical standpoint is often criticized by psychodynamically oriented clinicians for neglecting the symbolic nature of the image.

Other contemporary clinicians believe that images provide the client with a clear understanding of his or her perceptual and emotional distortions (Beck, 1970). Beck states that unpleasant feelings can be reduced by repetition of fantasies, and overt behavior can be modified through structured fantasy. Beck suggests that the therapist ask the client to fantasize a specific option or alternative course of action. These structured fantasies were found by Beck to facilitate more adaptive behavior and promote more realistic appraisal of external problems.

In J. K. Morrison's "emotive-reconstructive" therapy, images are used as a primary therapeutic agent (Sheikh & Jordan, 1983). The therapy focuses on interpersonal relationships, and as the name implies, there are two stages. In the emotive stage the focus is upon eliciting strong feelings about an individual the client is having difficulty with. In the reconstructive stage the client attempts to integrate what he or she has learned in therapy.

Reyher (1977), who developed a procedure known as "emergent uncovering," recommends utilizing a free association method with the emphasis on images rather than words. He contends that extended "free-imagery" allows the client to clarify underlying motivation for his or her behavior, even in the absence of interpretation by the therapist.

In Shorr's (1972, 1978) "psyco-imagination" therapy the clinician plays a much more active and directive role. To Shorr, imagination lies at the center of consciousness, and he has devised numerous imaginative situations to be used during therapy. In therapy, Shorr stresses identifying one's true self, and distinguishing this self-perception from that which has been attributed to the client by significant others from childhood.

With the emergence of the "third force" in psychology, there came an interest in access to experience, various states of consciousness, and in the expansion of the uses of one's potential (Sheikh & Jordan, 1983). This interest resulted in the development of a number of novel imagery techniques to accomplish these goals.

Among the most notable of the "third force" psychologists to utilize imagery techniques is Fritz

Perls & Goodman (1951). Perls was convinced that imagining could change personality, and thus he developed a technique in which he encouraged his clients to act the role of various characters in their dreams, fantasies, memories, and life situations.

Other clinicians (Oyle, 1976; Rossman, 1980) have developed techniques in which the client creates an inner advisor from which significant knowledge from the subconscious can be obtained. The inner advisor has been used to provide advice on how to reduce pain and stress, to give support and protection, and to provide symptom relief (Sheikh & Jordan, 1983).

Third force activities have resulted in group applications of imagery techniques. Gestalt therapists and other humanistically oriented clinicians have played the most significant role in popularizing the uses of imagery in group therapies (Perls, 1970; Schultz, 1967; Stevens, 1971). Shorr (1978) has applied his psycho-imagination therapy to groups. The procedure may involve everyone in the group imagining about a particular member, and the latter's reaction and imagery to the others imagery; or one individual imagining about every other group member in rotation, and their imagery about this individual in return.

Cognitive-behavioral therapists who utilize imagery have also applied it to group settings. For example, Meichenbaum has utilized his stress-inoculation technique in groups to successfully deal with problems involving anger, anxiety, and the lack of assertiveness (Lange & Jakubowski, 1976).

Other Applications of Imagery

Imagery techniques have demonstrated equivocal success in helping to eliminate somatic disorders. As Bry (1978) suggested, medical practitioners are developing a new understanding of the link between mind and body. Several medical clinics, including the "Psychosomatic Medicine Clinic" of Berkeley, California; the "Cancer Counseling and Research Center" in Fort Worth, Texas; UCLA's pain control unit; and the "Center for Attitudinal Healing" of Marin County, California, are utilizing imagery techniques to successfully combat such medical problems as intense pain, cancer, ovarian cysts, and migraine headaches.

The basic premise of these new healing techniques is that the mind and body are one inseparable system. Medical practitioners of imagery believe that if an individual can change his or her thoughts, the body can be changed as well. Using the mind, a person can influence the way in which the body grows, and what grows or does not grow.

Other assumptions underlying medically related imagery techniques include

1. The beliefs we have about ourselves have a direct relationship to our health.

2. If we change our belief systems, we change the condition of our health.

3. If an individual realizes that he or she has a part in creating the illness through thoughts and beliefs, then the individual can accept that he or she has a part in creating wellness.

4. Healing is most effective when we are active, responsible participants in our own healing process, rather than passive victims of disease or treatment.

One of the most dramatic uses of these ideas in medicine is that of Dr. Carl Simonton, who uses visualization techniques in conjunction with traditional medical therapy on patients with terminal cancer (Bry, 1978). Simonton's process is twofold. Clients who work with Simonton initially explore what may have caused the disease, and the reason why the client is wanting to live and/or die. They are also taught a deep relaxation exercise. When clients are able to relax successfully, they are asked to visualize their illness while in a state of relaxation. This visualization technique is performed three times a day. Some patients, for example, visualize the white blood cells as becoming knights in armor who attack the cancer. Simonton claims that the mental images are so powerful that they are able to prod the body's immunological system into destroying even the most widespread malignancy. Simonton reports great success with the technique, including complete remission with a 46 year old social worker with cancer of the colon who was diagnosed as incurable and on the brink of death before she came to Simonton.

Imagery techniques have also found their way into athletics in the form of "Imagery Rehearsal." Imagery rehearsal, as defined by Suinn (1983, p. 512) is a "covert activity whereby a person experiences sensory-motor sensations that reintegrate reality experiences." Athletes who utilize the technique often report not only imagal reproductions of experience, but also tactile, auditory, emotional, and muscular reproductions. For example, when recording electrical activity in the muscles of a professional ski racer who was asked to imagine skiing a certain course, Suinn and Dickinson (1978) recorded activity on an electromyogram which corresponded to that which would be expected if he were actually skiing the course.

Case reports, although not scientifically rigorous proof, offer encouraging support for imagery rehearsal techniques. A number of world famous athletes have attributed their success to imagery rehearsal. Three-time gold medalist Alpine skier Jean Claude-Killy reported that the only preparation he had for one of his best races was to mentally ski the course, due to an injury which prevented actual practice (Suinn, 1983). The successful golfer, Jack Nicklaus (1974) also utilizes an imagery rehearsal method to improve his golf swing. Chris Evert-Lloyd, the tennis champion, reports that she painstakingly rehearses through imagery her upcoming matches (Lazarus, 1977). During her imagery sessions, she attempts to anticipate her opponents strategy and style, and visualize herself countering with her own attack.

Sports consultants have used imagery rehearsal to improve athletic performance. Titley (1976) reported greatly improving a college field goal kickers performance through such techniques. Prior to the training, the kicker had missed 3 field goals from 35 yards, all of which had been very crucial to the outcome of the game. Following "visuomotor behavior rehearsal" (a combination of imagery and relaxation) the athlete improved his consistency and accuracy from greater distances, and later became the leader in conference scoring, establishing 14 school records. He also set an NCAA distance record with a field goal of 63 yards.

Winning Associates (1978) provides a program which includes relaxation training, desensitization, mental coping, and imagery rehearsal. This group reports helping bowlers, tennis players, and basketball players significantly improve their game.

One of the best research studies in the field of imagery involved the use of imagery rehearsal to improve the free-throw shooting of college basketball players. Kolonay (1977) investigated the effects of "visuomotor behavior rehearsal," relaxation alone, imagery-rehearsal alone, and no training, on the accuracy of free-throw shooting of 72 college basketball players over a 6 week period. The results clearly showed a significant 7% improvement in their performance. The relaxation only and imagery-rehearsal only group showed no change.

Imagery in Education

Richardson (1982) has outlined several uses of imagery in the educational setting. He states that any topic that has a behavioral implication, or that can change the student's lifestyle for the better, has the potential for an educational imagery strategy. Richardson details four general uses of imagery which are appropriate to the school setting; and these include cognitive imagery, affective imagery, recreational imagery, and decision making imagery.

Cognitive imagery is a strategy which can be utilized by teachers who deal in the cognitive realm and wish to supplement this with affective and behavioral methods. Cognitive imagery serves three purposes:

1. To ready students for learning material. For example, to prepare students for a poem, short story, or novel in an English literature class, the teacher can guide the students through an imagery trip involving the specific time period.

2. To aid in the learning process. Richardson states, for example, that research has shown that learning words and lists of words is facilitated when the words carry natural images. Thus, the pairing of words with images can facilitate their recall.

3. To reinforce cognitive information and concepts. In order to insure short and long term memory, the teacher can utilize imagery to repeat the concept rather than reviewing it in a lecture. For example, to reinforce a biology session on the circulatory system, the teacher could guide the students on an "imaginary fantastic voyage" through the circulatory system.

The purpose of affective imagery is to explore attitudes, values, and morals. With affective imagery, students are able to deal with sensitive and personal issues in the classroom, and the teacher is able to make the discussions nonbiased and personalized without the influence of peers. Richardson describes three kinds of affective imagery:

1. Emotional Imagery: The purpose of emotional imagery is to assist the student in seeing the world from other points of view. For example, the teacher can help the students gain empathy for the health dilemmas of special groups. Students can be asked to imagine themselves as a member of that special group, and feel the emotions of the dilemma (e.g., the disabled, poor, aged, and diseased). Students can also reverse roles with parents, or a sweetheart in order to aid understanding and communications.

2. Spiritual Imagery: Richardson does not mean this in a religious sense. This strategy involves the exploration of basic morals, integrity, and the sense of good and bad. Through spiritual imagery, the student is able to explore his or her own basic moral philosophy.

3. "Values Clarification" Imagery: Values clarification imagery allows the student to resolve issues privately while utilizing established "values clarification" methods such as "values voting," "critical incidents," "moral dilemmas," and "values ranking."

Life styling imagery is utilized to improve the lifestyle of the individual. There are three major functions of this kind of this type of imagery:

1. Role Assumption Imagery. The student creates his or her ideal image and explores ways in which this image might be attained.

2. Habit Breaking/Forming Imagery. Through this technique the student can be helped to overcome phobias, break bad habits, or develop more appropriate habits. Bad habits can be broken by imagining one's self engaging in the target behavior, and associating this with images of noxious stimuli. Good habits can be developed by imagining engaging in them and

associating them with pleasant images. To facilitate the process, the student is encouraged to utilize the technique outside of class.

Recreational imagery can help the student alleviate the stresses associated with school and life in general. The teacher can encourage the student to sit back, relax, and enjoy an imaginary escape from reality.

Decision-making imagery is used in the steps of the decision making process. Richardson reports that there are five general steps outlined in the literature which are involved in the decision making process and explains how imagery can be used to facilitate the process:

1. Identification of the problem or decision to be made. "Cognitive imagery" can be used to clarify the problem and gather relevant information.

2. Clarify the values and emotions associated with the problem with "affective imagery."

3. Explore alternative solutions to the problem through imagery sessions.

4. Explore the consequences of the alternatives. The students can choose two or three alternatives and follow the scenarios in their imagination to determine the outcome.

5. Make a final decision on the course of action and implement the action. Richardson describes the use of "simulation" imagery, in which the student works out the details of the solution in his or her imagination before actually implementing it.

Richardson's book demonstrates how imagery can be utilized to facilitate all levels of the educational process. Several research studies have been conducted which have shown to one degree or the other that imagery is an effective strategy within the educational setting, and these are discussed below.

Imagery Research in Education

Various research studies have demonstrated that imagery techniques can enhance academic performance and the development of appropriate school related behaviors.

Pressly (1976) utilized imagery to improve reading comprehension in 8-year-old elementary school students. Eighty-six third grade school children participated in the study, with 43 in the experimental group and 43 in the control group. The experimental group received training in forming images of the meanings of sentences (e.g., "The children rode the whale"). Both the experimental and control groups read 17 segments of a short story. The experimental group was instructed to construct a mental image for each segment, while the control group was instructed to do whatever they could in order to remember the story. Both groups then answered 24 test questions about the story. Results indicated that the experimental group answered significantly more questions than the control group.

A study by Bossenbrock-Schipper (1979/1980) also suggested that imagery training improved reading comprehension in sixth graders when compared to controls who received no such instruction. The difference in the performance between the two groups, however, was not significant.

Levin, Guttman, and McCabe (1977) investigated the effectiveness of two covert learning strategies in helping sixth graders to answer questions about 20 simple declarative sentences. Sixty-four students were randomly assigned to one of four experimental conditions: imagery, overt repetition, covert repetition, and control. Students in the imagery group were taught to form pictures of the sentences in their heads. The overt and covert repetition groups were instructed to repeat the sentences three times aloud, or to themselves, respectively. The control group was given no instructions other than to try to remember what they read. The results of the study clearly demonstrated that imagery instructions were superior to overt and covert repetition with respect to helping the children remember what they read.

Caban (1978) investigated the effect of mental imagery on spelling performance of elementary school children. There were three experimental groups: mental imagery, drill and practice, and control. The imagery group was instructed to form a mental image of the words to be spelled. All groups displayed significant improvement in correct spelling. The imagery group demonstrated the greatest amount of improvement.

Anderson (1975/1976) utilized guided fantasy and modeling to modify the acting-out behavior of fifth grade boys. Forty-eight fifth grade boys were screened with an acting out scale developed by the investigator, and randomly assigned to one of four experimental conditions: modeling, fantasy, modeling plus fantasy, and control. The modeling group listened to a series of tapes about a boy handling a hierarchy of anger producing situations while using self-control. The fantasy group listened to a tape in which they were instructed to imagine themselves involved in the same situations the boy in the modeling tape faced. The combined modeling plus fantasy group listened to both tapes. The control group was given unstructured time to talk with each other, draw pictures, or play games. All subjects were pre- and posttested with a teacher rating scale, a peer perception device, and frequency counts of the number of times the children were disciplined. The data suggested an overall trend towards decreased acting out behavior for the three treatment groups when compared to control, however; results were not significant.

Workman and Dickinson (1979) utilized covert positive reinforcement to control the inappropriate behaviors of a 9-year-old hyperactive child. Covert positive reinforcement sessions were conducted for six sessions during a 3 week period in an attempt to reduce out of seat behavior, excessive noise making, and rocking in chair behavior. Frequency counts of each behavior were obtained through 30 minute behavior observations taken on Mondays, Wednesdays, and Fridays during the treatment period. Treatment consisted of the school psychologist instructing the student to close his eyes and imagine himself sitting in class with all four legs of his chair on the floor, while looking straight at the teacher, and listening to every word she said. This was followed by having the student imagine himself engaging in 1 of 16 reinforcing activities. Reinforcing images were determined by asking the student to list the things he would like to do or receive as gifts. Ten reinforcing images were utilized during each covert positive reinforcement session in order to minimize the possibility of satiation occurring. Behavior frequency counts indicated that all three target behaviors were reduced substantially during the covert positive reinforcement condition.

Imagery and Attentional Behaviors of Elementary School Children

Few studies have been conducted which explore specifically the effect of imagery techniques on attentional behaviors of elementary and secondary school students. Those which have been conducted are, however, promising.

Wells (1980/1981) investigated the effects of a relaxation technique (Jacobson, 1938) which involved the use of imagery on the on-task and inseat behavior of three elementary school children. The experimental design was a multiple-baseline, single-subject type, with blind conditions, which allowed for an analysis of a novelty phase as well as treatment and return to baseline. Treatment consisted of three relaxation tapes ranging in length from 9 to 12 minutes administered over a 3 week period of time. The tapes included a deep breathing exercise to help relax the students, followed by a narrative encouraging the students to tighten and relax specific muscular groups. The verbal instructions were facilitated by having the students imagine various scenarios, such as a baby elephant stepping on their stomach, for which they must prepare by tightening their stomach muscles; or imagine a fly landing on their nose which they try to remove by wrinkling their nose and squinting up their face. Results indicated a reduction of off-task behaviors for all three subjects, and a reduction of out of seat behaviors for two of the subjects.

Workman (1977) attempted to increase on-task behavior in fourth-, fifth-, and sixth-graders through the application of covert positive reinforcement and covert modeling. Fifteen subjects were assigned to one of three treatment conditions in which a single subject design was utilized. Group I was exposed to an ABAB sequence, in which the "A" condition represented a baseline phase, followed by "B," a covert positive reinforcement technique. Group II was exposed to an ABACA sequence of conditions in which "A" represents a baseline phase; "B," a covert positive reinforcement technique in a classroom environment; and "C," a covert positive reinforcement technique presented in a small group setting. Group III was exposed to an ABACDE sequence in which "A" represents a baseline phase; "B," a covert modeling treatment presented in a classroom study; "C," a covert modeling treatment presented in a small group setting; "D," a covert positive reinforcement treatment presented in a small group setting; and "E," a covert positive reinforcement treatment administered on an individual basis. Data were obtained through classroom observations of on-task behavior. Results of the study did not indicate a clear effect for any of the covert positive reinforcement or covert modeling conditions. Workman discussed a number of procedural factors which may have accounted for lack of significant findings.

Edenfield (1979) investigated the effects of enhanced versus nonenhanced directed positive imagery on the effortful academic behavior of fifth graders. A total of 342 students assigned to 12 fifth grade classrooms were assigned to one of six experimental groups: pre- and posttested, no treatment control; posttested only, no treatment control; pre- and posttested, nonenhanced imagery treatment; posttested only, nonenhanced imagery treatment; pre- and posttested, enhanced imagery treatment; and posttested only, enhanced imagery treatment. The specific behavior of interest was the computation of single digit addition problems. The treatment conditions consisted of the application of five directed imagery tapes in which the children were instructed to imagine themselves performing the arithmetic problems, immediately followed by the presentation of an imaginary food reinforcer. Reinforcers were determined through the administration of a survey prior to treatment conditions. The descriptions of the reinforcers were either enhanced (the narrative was highly descriptive in terms of visual stimuli, smell, tactile sensation, and taste) or nonenhanced (the students were simply instructed to imagine themselves consuming the reinforcer, with no elaboration). Comparisons of pre- and posttested performances showed no significant differences in the performance between the enhanced and nonenhanced treatment groups; however, the treatment groups demonstrated significant increases in performance when compared to the control group. Thus, the application of the imagery technique appeared to help the children remain on-task and complete more arithmetic problems.

Brackett (1979) has developed a technique she terms "The Concentration Box" which is designed to increase the attention span and build the capacity to concentrate in elementary school children. Brackett begins the procedure by placing the children in a relaxed state with deep breathing exercises. When the children are relaxed, they are asked to imagine an empty box, into which they are asked to place the image of any concrete object (e.g., a favorite food, animal, or favorite story character). Once the image is in the box, the child closes and locks the door. Each child is instructed to concentrate carefully on the image, noting such attributes as color, texture, shape, and actions. The child might be asked to direct the actions of the image.

Brackett reported that this technique not only helps to increase attention span, but also appears to help children in retaining number facts, spelling words, and other memorized facts. No experimental data are reported to support the contention.

Summary

From the literature it appears that directed imagery is a viable therapeutic technique. Researchers have reported that when behaviors are rehearsed in therapy at the imaginal level, the effect tends to generalize to real situations with positive effects (Beck, 1970; Kolonay, 1977; Richardson, 1969). In the present study, a series of audio tapes were designed for fifth grade students perceived by their teachers as having attending problems. The tapes encouraged them to imagine attending to and engaging in certain academic endeavors. The major hypothesis predicted that these students would demonstrate a significant and positive improvement in attention, whereas a control group receiving nonacademic imagery and a no treatment control group would not.

CHAPTER III
METHODOLOGY

Teachers frequently report that particular students of theirs have difficulty staying on task and finishing their work. The purpose of the present study was to investigate the effects of a directed imagery technique on the attention of fifth graders who are perceived by their teachers as being distractable. This technique was chosen as an intervention strategy for the present study in light of the fact that there is a substantial amount of research suggesting that directed imagery is a powerful tool for changing behavior. Additionally, children seem to naturally enjoy fantasy and daydreaming.

Subjects

A total of 57 fifth grade students from six elementary schools in Alachua County, Florida, participated in the study. A letter was distributed to all fifth grade teachers in the 6 elementary schools explaining that a study is being conducted to learn more about students who display behavioral and academic problems in the classroom (Appendix A). The specific nature of the study was not revealed to the teachers until its completion in order to control for any effects their knowledge might have on the outcome. The letter asked the teachers to submit names of those students whom they felt exhibit such problems.

After the teachers had submitted names of prospective subjects, they were asked to rate the students on the "Poor Attention," "Poor Impulse Control," and "Poor Academics" scales of the Burks' Behavior Rating Scales. Those students falling within the "significant" to "very significant" range on the "Poor Attention" scale were selected as potential subjects.

Subjects selected to participate in the study were interviewed by the school counselor, given a brief explanation of the program, and asked if they would like to participate. Additionally, a letter was sent to the parents of each child to obtain consent for them to participate in the study (Appendix B).

The experimenter and school counselor consulted with the fifth grade teachers to elicit their support for the program. Teachers were told that the purpose of the research would be made clear to them at the end of the study.

Counselors participating in the study had to meet the following requirements: (a) employed as a full time counselor by a single elementary school in Alachua County, Florida; (b) certification as an elementary school counselor by the Florida State Department of Education; (c) have at least one full year of counseling experience in an elementary school; and (d) participate willingly in the directed imagery program for children exhibiting attentional problems.

The investigator met individually with each counselor to instruct them in the administration of the study. Specific instructions for the counselors may be seen in Appendix C.

Hypothesis

The study focused on one major hypothesis concerning children exhibiting attending problems and their reaction to (a) a directed academic imagery treatment program, (b) a series of nonacademic imagery sessions to control for relaxation and counselor attention, and (c) a control group receiving no treatment. The following hypothesis was studied:

The group receiving academic imagery will demonstrate a significant and positive improvement on the "Poor Attention," "Poor Impulse Control," and "Poor

Academics" scales of the Burks' Behavior Rating Scale, the Piers-Harris Children's Self-Concept Scale, and the Marathon Math Activity, whereas the group receiving nonacademic imagery and the no treatment group will not. For purposes of the analysis the hypothesis was tested in the null form at the .05 level.

Design of the Study

The design of the study was a randomized group, repeated measures design. The study ran for a total of nine weeks. The full-time elementary school counselors organized and coordinated the study as well as led the treatment and control groups in their own schools. During the first week of the study, the counselors received the directed imagery tapes and ensured that each fifth grade teacher in the school received a letter from the experimenter soliciting the names of children with behavioral or academic problems to participate in the study.

During the second week of the study the counselors introduced the teachers to the Burks' Behavior Rating Scales and instructed them to complete only those items which the investigator had previously circled in red (15 items total). The items circled in red corresponded to the categories of "Poor Attention," "Poor Impulse Control," and "Poor Academics."

Teachers were not asked to complete the entire 110 items of the Burks' Behavior Rating Scale because the counselors had explained earlier that most would be opposed to this given the amount of time required to complete the scale. This modification should not have significantly affected the validity of the instrument as Burks (1983) reported that most of the symptoms can stand by themselves with little or no consociation with the other category disorders.

During the third week of the study the three behavior categories of the Burks' Behavior Rating Scale were scored and only those children falling within the "significant" to "very significant" scale of the Burks were selected to participate in the study. The subjects were then administered the Marathon Math Activity and asked to complete the Piers-Harris Self-Concept Scale. These two instruments were administered either by certified school psychologists or school psychology interns under the supervision of a certified school psychologist. Subjects at each school were tested as an intact group in order to approximate group classroom conditions.

During the fourth week of the study, subjects were randomly assigned to either Groups A, B, or C using a table of random numbers. A total of 19 children were assigned to each group. Counselors held an orientation meeting for the treatment groups to briefly explain what would take place in the following sessions. For a period of 5 weeks the treatment groups met once a week for approximately 30 minutes. During these sessions the subjects listened to the tapes, after which the subjects were allowed to discuss their experiences. As the students discussed their experiences, the counselors were instructed to reflect and clarify feelings. The no treatment control group was not exposed to the tapes and did not meet with the counselor.

In the final week all posttest data were collected in a similar manner to the pretest data.

Selection of the Target Behaviors

The inability of children to attend to required academic tasks is one of the most frequently reported problems by teachers (Hewett & Taylor, 1968). The school setting frequently requires that children be able to attend to certain aspects of the school environment for a sustained length of time. Two situations which children frequently encounter in school which require sustained attention are (a) working in seat, and (b) attending to the teacher during instructional periods. For this reason, these two general categories of behaviors were chosen as the focus of the directed imagery treatment tapes.

Development of the Imagery Tapes

In this study, the imagery sessions were presented via audio tape recording. This was done in an effort to maximize experimental control as suggested by Edenfield (1979) and Kolonay (1977). Additionally, with respect to the school setting, the electronic production of treatment sessions is reported to be more practical in situations involving limited staff, multiple and repeated treatment sessions, and "homework" or "self-help" sessions (Edenfield, 1979).

Two series of audio tapes were developed for this study, and each series contained 5 sessions lasting approximately 12 minutes each. One series of tapes consisted of the directed imagery of academic behaviors and one series consisted of the directed imagery of nonacademic scenarios.

Each tape session was comprised of three sequential segments. The first segment of each session consisted of a brief introduction and abbreviated breathing and muscle relaxation exercise (Appendix C). Students were instructed by the tape that in order to get the "best feelings" from the exercise, they must try hard to do exactly as instructed. Many researchers (Anderson, 1975; Brackett, 1979; Edenfield, 1979; Skovholt & Hoenninger, 1974) have utilized relaxation exercises preceding an imagery session. This is done in order to focus attention on the therapist's voice, minimize psycho-motor activity, and reduce resistance to participation in the fantasy resulting from possible embarrassment or novelty effect. The abbreviated relaxation exercise encouraged subjects to engage in a deep breathing activity, followed by imaginary scenes requiring the alternate constriction and relaxation of muscle groups in the arms, hands, legs, and feet.

The second segment of each tape consisted of either the academic imagery for Group A (Appendix D) or nonspecific guided fantasy sessions for Group B (Appendix E).

Development of the Academic Imagery Tapes

The academic imagery tapes were developed on the premise that imagery procedures can be utilized to simulate reality situations which can result in positive behavior changes. Researchers have found that behaviors rehearsed at the imaginal level during therapy tend to generalize to situations outside the therapy session (Beck, 1970; Richardson, 1969). Athletes frequently rehearse behaviors at the imaginal level in an attempt to improve their performance in actual competition, and many report encouraging results (Lazarus, 1977; Nicklaus, 1974; Suinn, 1983). Kolonay (1977) clearly demonstrated that free-throw shots rehearsed in the imagination significantly improved the actual free-throw shooting of college basketball players.

In light of the above findings, the treatment tapes designed to improve the attending skills of elementary school students consisted of verbal directives encouraging the students to imagine themselves attending to various educational tasks. Each tape of the series concerned a different situation in an attempt to improve generalization to the actual classroom setting. The first tape of the series included a body awareness exercise to help the students practice focusing their attention at the imagery level, and encouraged students to use their other-than-sight senses (Wittmer & Myrick, 1980). The second tape encouraged the students to imagine their classroom and focus on various aspects of their educational environment at the imagery level. The third tape encouraged the students to imagine taking a spelling test. The fourth tape encouraged the students to imagine doing math problems at their seat. The fifth and final tape of the series encouraged the students to imagine attending to their teacher during a lecture period.

Development of the Nonacademic Imagery Tapes

The purpose of the nonacademic imagery tapes was to control for the effect of counselor attention, relaxation, and the "novelty effect." Ary, Jacobs, and Razavieh (1979) explain that experimental results of a research study can be partly due to the enthusiasm or disruption generated by the newness or novelty of the treatment. The nonacademic imagery tapes consisted of five guided fantasy sessions. The nonacademic imagery tapes differed from the academic imagery tapes in that there was no focus on attending behaviors relevant to the educational setting in the tape narrative. The children in the nonacademic imagery group were simply encouraged to relax and take various imaginary journeys. The children in this group also met on five occasions and had the opportunity to discuss their experiences with the counselor.

The third segment of each tape involved a termination phase. As recommended by Edenfield (1979) to develop imagery closure, the termination segment consisted of a series of hierarchal instructions directing the transition to a positive nonimagery state.

Several studies have demonstrated the efficacy of pauses of duration from 5 to 30 seconds following imagery instructions to allow subjects sufficient time to form mental images (Ascher & Cautela, 1972; Baron, 1975; Cautela, Steffan, & Wish, 1970; Wisocki, 1973). For this reason, pauses following the imagery instructions in the tapes for this study were no less than 5 seconds and no more than 30 seconds in length.

Instrumentation

The data for this study were gathered through the use of the Burks' Behavior Rating Scale, the Marathon Math Activity, the Piers-Harris Self-Concept Scale, and the subject questionnaire.

Burks' Behavior Rating Scale (BBRS)

This 5-point Likert-type scale was designed to gauge the severity of negative conduct symptoms which can be observed by other persons. Burks (1983) reported that factor analysis indicated that the 110 items clustered into 19 groups. Each factor describes a cohesive pattern of symptoms, or "behavior syndromes." The rater reads each item (i.e., "blames himself if things go wrong") and then indicates the extent to which the behavior is observed by assigning anywhere from 1 to 5 points. A "1" indicates that the rater has never observed a particular behavior; a "5" indicates that the behavior has been observed to a very large degree. The raw score for each behavioral category is calculated and entered on a graph on the BBRS profile sheet. Based on norms established for the BBRS, one can determine from looking at the graph whether the score for a particular behavioral category is "nonsignificant," "significant," or "very significant." The lower the raw score, the less significant the behavior problem. Therefore, a decrease in raw score from one rating to the next would indicate an improvement in the behavior syndrome.

According to Burks (1983), research has shown that the BBRS has some ability to

1. Identify patterns of disturbed behavior which distinguish between several groups of children.

2. Show changes in behavior patterns over a period of time.

3. Provide a source of information useful to school personnel for conferences with parents.

4. Predict which children will do well in special education classes and which will not.

5. Indicate areas in a child's personality where further evaluation might advantageously take place.

6. Be of practical value when used by parents as well as teachers.

BBRS's are most frequently completed by teachers. According to Harth and Glavin (1971), teacher ratings are a valid method of screening children with behavior problems. In their study, it was hypothesized and demonstrated, that teachers can recognize different magnitudes of personality adjustment. The results of the study demonstrated that there was a high degree of agreement between teacher ratings and an objectively scored criterion.

Statistical studies involving the BBRS have shown it to have test/retest reliability coefficients ranging from .60 to .83 for individual test items. The average item/item retest correlation coefficient was .705 (Burks, 1983). The test/retest intervals were ten days. Burks (1983) reported that the case for the validity of his instrument rests on several sources. The appropriateness of each item was judged by teachers. Burks (1983) claims that the very extensive use of the scale has established face validity since teachers and parents agree that the BBRS profiles shown to them are consistent with their observations. The author also states that research efforts by himself, and statistical computations including extensive correlation and factor analyses, have demonstrated that content, construct, criterion related, and contrasted groups validity does in fact exist for the BBRS (Burks, 1983).

Marathon Math Activity (MMA)

The Marathon Math Activity (Appendix G) was developed by Edenfield (1979). It is a 1,200 item task requiring the computation of a single-digit, simple (having a one-digit solution), and complex (having a two-digit solution) arithmetic addition problems. The MMA was chosen for the present study because it was designed to approximate routine, repetitive tasks requiring sustained effort and attention which children frequently encounter in school. An introduction lasting approximately 2-1/2 minutes was developed for the MMA (Appendix H), and there is a 15 minute time interval in which to complete as many items as possible. The MMA is scored by awarding one point for each correct answer.

Test/retest reliability was established in a pilot study consisting of 73 fifth grade students of various ethnic backgrounds. The resulting correlation coefficient for a 15 minute administration was 0.94 for a three week retest interval.

Piers-Harris Children's Self-Concept Scale (The Way I Feel About Myself

The Piers-Harris Children's Self-Concept Scale (P-HCSCS) was utilized in this study to measure changes in self-concept as a function of treatment.

The P-HCSCS (Piers, 1984) consists of 80 declarative first person statements such as "I am a happy person" to which the child responds either "yes" or "no." Half of the items are worded to indicate a positive self-concept, and half to indicate a negative self-concept. Administration requires approximately 15 to 20 minutes.

The P-HCSCS was standardized on 1,183 children in grades 4 through 12 in one Pennsylvania school district. Bentler (1972) reported that there appear to be no consistent sex or grade differences in means. Retest reliability of the scale ranges from .71 to .77 for a retest interval of four months and the internal consistency ranges from .78 to .93. Bentler also reported that correlates with similar instruments are in the mid-sixties, and teacher and peer validity coefficients are on the order of .40.

The P-HCSCS manual recommends that the scale be used for studies of changes in self-concept. The researcher is urged to use a control group because scores on the scale tend to increase slightly with retesting. Norms for the P-HCSCS are presented in percentile and stanine fashion.

Subject Questionnaire

A brief questionnaire (Appendix I) was developed to be distributed to the subjects following the treatment conditions. The purpose of the questionnaire was to ascertain subject's perceptions of the helpfulness of the treatment, their ability to engage in the treatment activities, and whether they enjoyed the activities. Subjects were asked to respond anonymously in an attempt to ensure that their responses were genuine.

Analyses of Data

The dependent variables in this study were the raw scores from the Burks' Behavior Rating Scale, the Marathon Math Activity, and the Piers-Harris Children's

Self-Concept Scale. A 3 x 2 repeated measures analysis of variance was used to test for pretest/posttest differences. The overall analyses were followed by planned comparisons to test the alternative hypothesis, when the analyses of variance indicated significant pretest/posttest differences.

CHAPTER IV
ANALYSES AND RESULTS

The purpose of this study was to investigate the effects of directed academic imagery on the attention of fifth grade students perceived as having attending difficulties by their teachers. Additionally, the study investigated the effects of directed academic imagery on the impulsivity, academics, and self-concept of these students, and on the performance of these students on an academic task requiring sustained attention.

Based on the review of the literature, it was hypothesized that a group receiving academic imagery would demonstrate a positive and significant change in the dependent variables, while a group receiving nonacademic imagery and a no treatment group would not. The dependent variables included teacher ratings on the "Poor Attention," "Poor Impulse Control," and "Poor Academics" scales of the Burks' Behavior Rating Scale, subject ratings on the Piers-Harris Children's Self-Concept Scale, and subject performance on the Marathon Math Activity. Data were analyzed using the

Biomedical Computer Program (Dixon, 1981). For purposes of the analysis the hypothesis was tested in the null form at the .05 level.

Analysis of variance summaries are shown in Table 1. A significant change in pretest to posttest measures among the three groups on the "Poor Attention" scale was displayed, ANOVA $\underline{F}$ (1, 43) = 6.70, $\underline{p}$ = 0.01. Thus, the null hypothesis was rejected for the dependent variable "Poor Attention." No other effects significant at the .05 level were observed.

Comparisons of changes in pretest to posttest measures on the "Poor Attention" scale were made using Fisher's Least Significant Difference (Keppel, 1982). As can be seen in Table 2, pretest and posttest means (and standard deviations) for the "Academic Imagery," "Nonacademic Imagery," and "No Treatment" groups on the "Poor Attention" scale were 17.59 (4.18) and 15.24 (5.11), 18.57 (5.39) and 16.86 (6.49), 18.47 (4.12) and 17.13 (5.13), respectively.

Pretest to posttest measures indicate a significant and positive change for the group receiving academic imagery, which was significant at the .05 level, $\underline{t}$ (16) = 2.16. Changes in pretest to posttest measures for the group receiving nonacademic imagery and the no treatment group were in a positive direction, but not significant.

TABLE 1
SUMMARY OF ANALYSIS OF VARIANCE

Dependent Variable	Source of Variance	df	MS	F	Level of Significance
POOR ATTENTION	Between Subjects				
	Treatment	2	19.49	0.48	0.62
	Error	43	40.76		
	Within Subjects				
	Repeated Measures	1	74.05	6.70	0.01
	Treatment by Measure	2	2.13	0.19	0.83
	Error	43	11.05		
POOR IMPULSE CONTROL	Between Subjects				
	Treatment	2	101.49	1.55	0.22
	Error	43	65.35		
	Within Subjects				
	Repeated Measures	1	27.77	3.05	0.09
	Treatment by Measure	2	7.76	0.85	0.43
	Error	43	9.11		
POOR ACADEMICS	Between Subjects				
	Treatment	2	12.34	0.25	0.78
	Error	43	50.02		
	Within Subjects				
	Repeated Measures	1	13.38	1.19	0.28
	Treatment by Measure	2	6.09	0.54	0.58
	Error	43	11.21		
SELF-CONCEPT	Between Subjects				
	Treatment	2	265.90	0.87	0.43
	Error	38	306.43		
	Within Subjects				
	Repeated Measures	1	8.13	0.21	0.65
	Treatment by Measure	2	100.52	2.63	0.08
	Error	38	38.17		
PERFORMANCE ON MARATHON MATH ACTIVITY	Between Subjects				
	Treatment	2	62726.67	2.04	0.14
	Error	38	30677.05		
	Within Subjects				
	Repeated Measures	1	2175.79	0.23	0.63
	Treatment by Measure	2	159.52	0.02	0.98
	Error	38	9421.64		

TABLE 2
PRETEST TO POSTTEST COMPARISONS

Dependent Variable	Group	n	Pretest Means & (Standard Deviations)	Posttest Means & (Standard Deviations)	Fisher's LSD One-Tail
POOR ATTENTION	Academic Imagery	17	17.59 (4.18)	15.24 (5.11)	*t* = 2.16*
	Nonacademic Imagery	14	18.57 (5.39)	16.86 (6.49)	*t* = 1.37
	No Treatment	15	18.47 (4.12)	17.13 (5.13)	*t* = 1.18
POOR IMPULSE CONTROL	Academic Imagery	17	14.47 (5.48)	12.88 (5.70)	N.S.
	Nonacademic Imagery	14	16.50 (7.32)	14.71 (6.12)	N.S.
	No Treatment	15	17.20 (6.07)	17.27 (5.98)	N.S.
POOR ACADEMICS	Academic Imagery	17	16.00 (6.02)	15.65 (5.51)	N.S.
	Nonacademic Imagery	14	17.07 (5.25)	16.93 (6.22)	N.S.
	No Treatment	15	17.67 (5.45)	15.87 (4.55)	N.S.
SELF-CONCEPT	Academic Imagery	17	58.47 (13.38)	60.24 (15.11)	N.S.
	Nonacademic Imagery	14	56.36 (11.01)	51.36 (12.99)	N.S.
	No Treatment	10	54.10 (10.94)	55.40 (13.85)	N.S.
PERFORMANCE ON MARATHON MATH ACTIVITY	Academic Imagery	17	301.65 (134.85)	285.76 (140.99)	N.S.
	Nonacademic Imagery	14	369.79 (155.87)	360.71 (170.23)	N.S.
	No Treatment	10	273.70 (83.30)	267.00 (133.21)	N.S.

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* $p < .05$

Although no other effects significant at the .05 level were observed, analysis of variance indicated changes in pretest to posttest measures on the "Poor Impulse Control" scale which were significant at the .10 level, ANOVA (1, 43) = 3.05, $\underline{p}$ = .09. As can be seen in Table 2, these changes were in the direction predicted by the directional hypothesis. Pretest and posttest means (and standard deviations) for the "academic" imagery, "nonacademic" imagery, and "no treatment" groups were 14.47 (5.48) and 12.88 (5.70), 16.50 (7.32) and 14.71 (6.12), and 17.20 (6.07) and 17.27 (5.98), respectively. Thus, the groups receiving academic imagery and nonacademic imagery demonstrated positive gains, while the no treatment group remained essentially the same on the "Poor Impulse Control" scale.

Table 3 displays subject's responses to the subject questionnaire for the academic and nonacademic imagery groups. Percentages of subjects within each group responding affirmatively to each question are listed. As can be seen from the table, the majority of subjects in both treatment groups responded affirmatively to the questions.

TABLE 3
PERCENTAGE OF SUBJECTS RESPONDING AFFIRMATIVELY
ON SUBJECT QUESTIONNAIRE

	Percentage of Subjects Responding Affirmatively	
Question	Academic Imagery Group n = 17	Nonacademic Imagery Group n = 14
1. Did you enjoy listening to the tapes?	94%	86%
2. Were you able to form the pictures in your head while listening to the tapes?	94%	86%
3. Do you feel that listening to the tapes helped you with your school work?	88%	79%
4. Would you enjoy listening to more tapes like these?	88%	79%

CHAPTER V
SUMMARY, DISCUSSION OF RESULTS, CONCLUSIONS, IMPLICATIONS, LIMITATIONS, RECOMMENDATIONS

Summary

The purpose of this study was to investigate the effects of directed academic imagery on the attention of fifth grade students perceived by their teachers as having attending problems. The specific questions to which the study was addressed were (a) Can the presentation of a directed imagery technique positively affect the attention, impulsiveness, and academics of elementary school students as perceived by their teachers? (b) Can the presentation of a directed imagery technique positively affect the performance of these children on an academic task requiring sustained attention? and (c) Can the presentation of a directed imagery technique positively affect the self-concept of these children?

The independent variable was the presentation of two series of five directed imagery sessions on audio tape. One series of tapes presented scenarios relating to academic behavior, while the other series involved themes which did not relate to academics. The dependent variables were teacher ratings on the "Poor

Attention," "Poor Impulse Control," and "Poor Academics" scales of the Burks' Behavior Rating Scales, subject responses to the Piers-Harris Self-Concept Scale, and subject performance on an academic task requiring sustained attention.

A total of 57 fifth graders from six elementary schools in Alachua County, Florida, were randomly assigned to one of three groups: (a) academic imagery treatment; (b) nonacademic imagery treatment, to control for counselor attention and relaxation; and (c) no treatment control.

The study ran for a period of nine weeks. During the first week of the study the counselors at each school received the treatment tapes and distributed a letter to all the fifth grade teachers at each school asking them to submit the names of students exhibiting academic or behavioral problems.

During the second week of the study, the fifth grade teachers were asked to rate the children whose names they submitted on those items of the Burks' Behavior Rating Scale relating to the categories of "Poor Attention," "Poor Impulse Control," and Poor Academics." Those children falling within the "significant" to "very significant" range on the "Poor Attention" scale were selected to participate in the study.

During the third week of the study the children selected to participate completed the Piers-Harris Self-Concept Scale and were administered the Marathon Math Activity.

Over the fourth, fifth, sixth, seventh, and eighth weeks, subjects in the treatment groups received one treatment session per week. One treatment group listened to the tapes concerning directed imagery of academic behaviors, while the other group received the tapes involving nonacademic behaviors. Subjects in the no treatment control group were not exposed to the tapes.

At the beginning of the ninth week, the subjects' teachers again responded to the Burks' Behavior Rating Scale. Additionally, the subjects completed the Piers-Harris Self-Concept Scale and were administered the Marathon Math Activity. Subjects also completed the subject questionnaire during the ninth week of the study.

Due to attrition and difficulties encountered in collecting the data at two elementary schools, complete data were lost on 11 subjects (7 treatment, 4 control) and partial data (Piers-Harris, Marathon Math Activity) on 5 controls. As such, by the end of the study there were 17 children in the group receiving directed academic imagery, 14 children in the group receiving nonacademic imagery, and 15 children in the no treatment control group.

Scores for the pre- and posttreatment performance measures were computed for the two treatment groups and one no treatment group. The hypothesis predicted that the group receiving academic imagery would demonstrate a significant and positive change in the dependent variables, whereas the group receiving nonacademic imagery and the no treatment group would not. The independent variables were teacher ratings on the "Poor Attention," "Poor Impulse Control," and "Poor Academics" scales of the Burks' Behavior Rating Scales, subject ratings on the Piers-Harris Children's Self-Concept Scale, and subject performance on the Marathon Math Activity.

Discussion of Results

The first research question asked: Can the presentation of a directed imagery technique positively affect the attention, impulsivity, and academic of elementary school children as perceived by their teachers? Analyses indicated that the subjects receiving directed academic imagery were perceived by their teachers to have made a significant and positive change in attention. The group receiving nonacademic imagery and the no treatment control group were not perceived to have demonstrated significant positive change. This significant and positive change in attention for the group receiving directed academic imagery was revealed by a positive change significant at the .05 level in pre- to posttest mean performance measures from 17.59 to 15.24. Subjects in the nonacademic imagery group and no treatment control group failed to show a significant positive change in attention as revealed by a statistically nonsignificant difference between pre- and posttest means (18.57 to 16.86 and 18.47 to 17.13, respectively). Changes for the nonacademic imagery group and no treatment control group, though nonsignificant, were in a positive direction, and might result from "Pretest Sensitization" in which the teachers exposure to the pretest may have affected their ratings on the posttest, regardless of experimental treatment (Ary, Jacobs, & Razavieh, 1979).

Additionally, one might expect the group receiving nonacademic imagery to display a positive change, since the treatment involved relaxation exercises which have been shown to have therapeutic effects on behavior. For example, Wells (1981), demonstrated that relaxation techniques could be employed to control inappropriate behaviors of emotionally handicapped children.

No significant pretest to posttest differences in teacher ratings of impulsivity or academics among the three groups was indicated by the analysis of variance.

Although the difference in pre- and posttest scores on the impulsivity scale of the Burks' Behavior Rating Scales was not significant, the changes were in the direction predicted by the hypothesis. The groups receiving the directed academic imagery and directed nonacademic imagery treatment displayed a slight improvement in impulsivity approaching two raw score points (see Table 2), whereas the group receiving no treatment displayed a minimal change in the opposite direction. Again, the positive change in impulsivity for the group receiving nonacademic imagery is not surprising given the treatment involved relaxation activities.

With regard to the second research question: Does the presentation of a directed imagery technique positively affect the performance of elementary school children on an academic task requiring sustained attention? Analyses indicated no significant pretest to posttest differences in subject performance on the Marathon Math Activity for the three groups.

In fact, as can be seen from the pretest and posttest means for the Marathon Math Activity (see Table 2), the mean number of problems correctly computed for all three groups actually decreased. During the administration of the posttest of the Marathon Math Activity, subjects frequently remarked that they did not enjoy performing the task, or they had recently performed the task (six weeks previously to be exact) and did not wish to attempt it again. Some of the subjects chose not to work at all and sat for 15 minutes doing nothing. Thus, it appears that the adverse nature of the task had a significant effect on the performance of the subjects. Edenfield (1979) found improvement on the same instrument using the general school population from which to draw subjects. The present study focused on students with significant attending problems, and falling at the extreme, they may have experienced much more difficulty in responding to the instrument.

Finally, with regard to the fifth research question: Does the presentation of a directed imagery technique positively affect the self-concept of elementary school children? Analyses indicates no significant pretest/posttest differences among the three groups on the Piers-Harris Self-Concept Scale.

Two additional factors might account for failure to achieve significant results on four of the five measures utilized in the present study. It appears that the directed imagery treatment effect was small enough that it may have been masked by (a) subject variability and (b) error variance inherent in the instruments used. Sample size in the present study was necessarily small due to the size of the population from which it was drawn. The sample size was further reduced during the course of this study through attrition and difficulties encountered in conducting the study at two of the schools. A brief power analysis (Keppel, 1982) suggested that given the variability among subjects in the present study, one would have to quadruple the sample size in order to obtain significance for the treatment effect. Another possible source of error variance lies within the instruments themselves. For example, the Burks' Behavior Rating Scale is a Likert-type scale involving some subjectivity, thus inviting error on the teachers part in the process of rating students. Possible methods for combating this problem are discussed later in this chapter.

The subject survey was developed to assess the subject's opinion of the helpfulness of the directed imagery treatment and to ascertain their ability to engage in the activity. As can be seen from Table 3, the majority of subjects in both treatment groups (a) enjoyed listening to the tapes, (b) were able to produce visual images corresponding to the verbal instructions on tape, (c) believed that listening to the tapes helped them with their schoolwork, and (d) would enjoy listening to similar tapes.

Conclusions

With regard to the first research question to which this study was addressed, results suggest that for the population studied, the presentation of directed imagery of academic behaviors did improve the attention of the fifth grade elementary school students as perceived by their teachers. The use of this technique did not appear to significantly affect impulsivity or general academic performance as perceived by the teachers although there is an indication that impulsivity was positively affected.

With regard to the second research question, results indicate that for the population studied, the presentation of directed academic imagery did not positively affect the performance of the subjects on an academic task requiring sustained attention.

Finally, with regard to the third research question, results indicate that the presentation of a directed imagery technique did not positively affect the self-concept of the subjects involved in this study.

Subject responses to the subject questionnaire suggest that the majority of the participants were able to successfully engage in the imagery activity, believed that it helped them with their schoolwork, enjoyed engaging in the imagery activities, and would enjoy participating in more imagery activities.

Implications for Classroom Application

Poor attention on the part of their students is one of the most frequently reported problems by classroom teachers (Goodman, 1978; Hewett & Taylor, 1968). This study made an attempt to improve attending skills of fifth grade students perceived by their teachers as having poor attention through a directed imagery technique which focused on academic behaviors. The investigator attempted to measure teacher perceptions of any changes in attention, impulsivity, and academic behaviors of the subjects resulting from treatment. Additionally, an attempt was made to measure changes in the self-concept and any changes in the subjects' performance on an academic task requiring sustained attention. This study yielded results from which limited implications for applications of directed imagery in the classroom may be drawn.

The overall results of this study suggest that directed academic imagery can positively affect the attention of students with attending problems to the extent that the change is perceived by their classroom teachers. This effect is important, because poor attention not only has a detrimental effect on the academic performance of these students, but is very trying for the teachers who must instruct them. With an improvement in the attention of these students, the teachers might direct more of their time to the instruction of the entire class which otherwise might have been spent controlling and assisting those students with attending problems.

Subjects did not improve on the other variables investigated in this study. Some possible explanations for this were discussed earlier in this chapter under "Discussion of Results."

The results of this study also indicate that directed imagery techniques can positively influence complex school-related behaviors. The majority of directed imagery studies conducted in the school setting have focused on specific academic behaviors. Edenfield (1979), for example, used directed imagery to improve the performance of elementary school students on a simple arithmetic activity. Edenfield suggested that directed imagery might also positively influence more complex academic behaviors. The results of the present study support this contention, as subjects in the study were judged by their teachers to show improvement in the more complex set of behaviors included under the "Poor Attention" scale of the Burks' Behavior Rating Scales.

Although this study was limited to the investigation of attention, impulsivity, and academics, similar imagery tapes might be developed to focus on other sets of problem behaviors exhibited in the school setting such as poor self-esteem, withdrawal, anxiety, and poor social conformity.

Other advantages reported to be inherent in the use of imagery techniques were further substantiated in this study. Kelly (1972) reports that directed imagery techniques are particularly appealing to young children, and the majority of students participating in this study reported on the subject questionnaire that they enjoyed listening to the tapes and would like to listen to more. Additionally, counselors participating in the study remarked that subjects reported enjoying the activities and had approached them asking to listen to additional tapes.

Kelly also reported advantages with respect to financial and temporal considerations. Although a significant amount of time was involved in developing the tape scripts for this study (approximately 1 week), the recording process was accomplished in the space of 2 days, and the tapes were inexpensive to purchase. Additionally, the tapes can be used over and over again with small groups of children. Counselors in the study remarked that they were glad to use a therapeutic technique which required so little of their time and effort.

Limitations of the Study

The conclusions of this study are limited by a number of experimental restrictions and theoretical assumptions:

1. The number of students in each treatment group was necessarily small due to the size of the population from which they were drawn. Additionally, data were lost on a few of the subjects due to attrition

and difficulties encountered in conducting the study at two of the schools. This resulted in a small sample size in each group which limits reliability and representativeness, and reduces power.

2. The conclusions of this study are limited by the specificity of the population studied.

3. The conclusions of this study are limited by the assumption that the school principals', guidance counselors', teachers', and parents' willingness to participate in the study did not affect selection biases.

4. The conclusions of this study are limited by the assumption that subjects in the study were able and willing to engage in the prescribed imagery. Although subject responses to the subject questionnaire indicate that the majority of the children were able and willing to do so, the validity and reliability of self-referent data are restricted (Issac & Michael, 1979).

5. Finally, time restrictions on the availability of the population studied precluded multiple posttesting to determine maintenance of the treatment effect.

Recommendations for Further Research

The results of the present study are promising but the conclusions which may be drawn from it were limited by failure to obtain significance on four of the five instruments used to measure changes in the dependent variables. It appears that subject variability and error variance inherent in some of the instruments may have masked much of the treatment effect.

If the present study were to be replicated or a similar study conducted, error due to subject variability might be reduced by securing a larger sample size. The researcher was unable to obtain a large referral of students from the six elementary schools participating in the study; as such it might be necessary to involve an entire school district when working with such a limited population in the future.

Error variance within the instruments used in the present study may also have accounted for failure to achieve significance. For example, the Burks' Behavior Rating Scale is a Likert-type instrument and therefore involves some subjectivity. Since most behavior rating scales are similar in format, future investigators interested in similar studies might be well advised to choose an alternative method for measuring changes in target behaviors. A more objective course of action might be to utilize a single subject design with direct observation of target behaviors.

Additionally, the number of treatment sessions in this study was limited to five. Increasing the number of treatment sessions might help to clarify the effect of the directed imagery technique.

Finally, the results of the present study suggest that directed imagery can positively influence complex school-related behaviors. Future studies of this kind might investigate the effects of tailor-made directed imagery techniques on other kinds of complex problem behaviors encountered in the classroom.

APPENDIX A
LETTER TO THE FIFTH GRADE TEACHERS

Dear Teacher,

I am a school psychologist for Alachua County, and I am also completing a doctorate in school psychology at the University of Florida. To partially fulfill the requirements for a doctorate, I have developed a series of directed imagery exercises to help children who are experiencing academic or behavior problems in school. Directed imagery is a therapeutic technique whereby a subject is verbally encouraged to engage in the production of mental images, the content of which is suggested by the therapist. The effectiveness of directed imagery in producing positive behavior changes is well documented in the literature. If you have students who exhibit academic or behavioral problems, I would like to include them in my research. This study has been approved by the University of Florida and the School Board of Alachua County. Those children who participate in the study will meet as a group once a week for 5 weeks. Each session will last approximately one-half hour and will be supervised by the school guidance counselor.

If you have any students who exhibit academic or behavioral problems that you would like to have participate in this study, please list their names on the back of this letter and return it to the guidance counselor. For each child you submit, I would like to have you complete two brief behavior rating scales, once before the study begins, and again at its' completion. Upon completion of this study, I will share the results with you.

If you have any questions, please feel free to call me at Kirby Smith (395-0668), and leave a message if necessary. Thank you very much for your consideration.

Sincerely,

Tony Avila

APPENDIX B
PARENTAL CONSENT FORM

Dear Parents,

I am a school psychologist for the Alachua County Public School system. I am conducting a study designed to help students improve their ability to pay attention in class and complete their school work. If the study is successful it may result in better attending skills, increased school work, and perhaps better grades. The study has been approved by the University of Florida and the Alachua County School Board.

Students who participate in the study will simply listen to a series of 5 audio tapes which encourage them to relax and use their imagination to improve their attending skills. Educational research has shown these techniques to be very effective in helping children with their school work. Students participating in the study will meet with the school guidance counselor once a week for approximately 20 minutes to listen to the audio tapes. The study will run for 5 weeks.

I am asking your permission to allow your child, ____, to participate in the study. There is no monetary compensation for participation. Your child is free to withdraw from the study any time he or she wishes. You may also withdraw your child at any time you wish. Your child's grades will not be affected by his or her participation in the study, and every effort will be made to ensure that the groups are not run at a time when it would interfere with school work. If this should happen, your child will be allowed to make up any missed work. Your childs individual performance in this study will be made available only to you and your child. The general results of this study will be made available to your child's teacher, school counselor, principal, and the Research, Planning and Evaluation division of the School Board of Alachua County.

If you have any questions regarding the study, I encourage you to call me at my office (395-0668) between the hours of 8:00 a.m. and 5:00 p.m., or at my home (376-1019) after 5:00 p.m.

If you agree to allow your child to participate in this study please read the following statement and sign and date below.

I have read and I understand the procedure described above. I agree to allow my child to participate in the procedure and I have received a copy of this description.

Subject	Date	Witness	Date
Relationship if other than subject	Date	Principal Investigator's Name	Date

Sincerely,

Tony Avila
School Psychologist

APPENDIX C
DIRECTIONS FOR COUNSELORS

Parental permission will be obtained by the researcher. Student participation is on a voluntary basis. Before running the groups, please meet with the children. Explain to them that they will be meeting once a week for five weeks to do some relaxation exercises and use their imagination. Those children who do not wish to participate will not be included in the study.

Environment

Please meet with the treatment groups in your office. The room should be quiet, and in order to reduce the possibility of interruptions, please place a "Do Not Disturb" sign on the door. The children may lie on a carpeted floor or sit in comfortable chairs, depending on the facilities available.

Treatment

Each group will be placed in a state of relaxation through exercises included in the tapes. In order to facilitate relaxation please insure that the following conditions are met: (1) children on the floor should lie on their backs, (2) hands should be kept to oneself, (3) turn off the light to be used as a cue to be quiet and to facilitate relaxation, and (4) eyes should be closed during the tape narrative.

Discussion

Following the taped narrative, allow the children time to discuss their experiences if they so desire. Allow discussion to flow freely as you reflect and clarify feelings. Feel free to utilize your facilitative skills.

APENDIX D
SCRIPT FOR THE ABBREVIATED RELAXATION EXERCISES

Hello! We are about to do some special kinds of exercises that will help you relax, and also give you some practice in using your imagination. In order for you to get the best feelings from these exercises, you must try hard to do exactly as I say.

First, get as comfortable as you can in your chair. Sit back, get both feet on the floor, and just let your arms hang loose (5-second pause). That's fine! Now, close your eyes gently. Don't squeeze them shut. Just let them close very gently, and please don't open them till I say so (5-second pause). Very good! Now, remember to follow my instructions very carefully. Here we go!

Now, we are going to breathe in very deeply. I want you to fill up your chest and stomach with air. As I count to four, breathe in slowly. I will then count to four as you hold your breath. Then I will count to four as you slowly let out the air so that when I get to four, you will have no more air left.

Let's try it. Breath in slowly 1-2-3-4, now hold, 1-2-3-4. And breath out 1-2-3-4. That's it! Let's do it again (repeat).

Now, with your arms hanging loose at your sides, imagine that you have a whole lemon in each hand (5-second pause). Now, squeeze the lemons hard. Try to squeeze all the juice out (5-second pause). Now drop the lemons. Notice how the muscles in your arms feel when they are relaxed.

Take another lemon in each hand. Squeeze them. Try to squeeze them harder than you did the first time (5-second pause). Now, relax your hands and let the lemons drop to the floor. Very good! See how much better your arms and hands feel now that they are relaxed!

Now, imagine that you are standing barefoot in a big, mushy mud puddle (5-second pause). Squish your feet down deep into the mud (5-second pause). Try to get your feet down all the way to the bottom of the puddle. Use your leg muscles to help you push, push hard! (5-second pause). While you are pushing down with your legs, spread your toes apart, and feel the mud squish up between your toes. Feel how tight your legs, toes and feet are (5-second pause). Now, step out of the mud puddle, and let your legs and feet relax (5-second pause). Notice how good it feels to be relaxed now.

APPENDIX E
SCRIPTS FOR THE ACADEMIC IMAGERY TAPES

Session One

Now that you are relaxed, I want you to follow your thoughts. Follow your thoughts just the way they are right now. Don't try to change them, but follow your thoughts for a moment (5-second pause). Now, for a moment, become aware of how you feel, not how you think you feel, or how you would like to feel, but your actual feelings and sensations as they are just now (5-second pause).

Now, without any movement, become aware of your feet. Become aware of what your feet are resting on (5-second pause). Don't think of what your feet are resting on; feel it, be aware of what they are resting on, picture it in your mind (5-second pause).

Be aware, concentrate on your right foot. First, be aware of the big toe (5-second pause), then your second toe, the middle toe, the next toe, and finally, the little toe on your right foot. Now, be aware of your right foot (5-second pause).

Now, feel, be aware of your ankles (5-second pause). Relax.

Now become aware of your right knee, the roundness, the firmness, experience your right knee (5-second pause). Now, shift your awareness to your left knee. Experience it.

Be aware of your upper legs (5-second pause). Your hips (5-second pause). Sense, be aware of that which you are sitting on.

Shift your awareness to your stomach. Is it tight? Where is it tight? Let it go, relax (5-second pause).

Now, be aware of your chest. Experience it (5-second pause). Be aware of your back and be aware of what your back is against (5-second pause).

Now shift your awareness to your right hand, and without any movement, be aware of your right thumb. Be aware of your fingers and what they are resting on (5-second pause). Move to your left hand. Sense your thumb and your fingers (5-second pause).

Now, be aware of your left elbow (5-second pause). Now, your right elbow (5-second pause).

Experience your shoulders and let them move just a little. Move your shoulders up and down. Be aware of your neck...your lips...your tongue...your nose...your eyes...your forehead. See your forehead, be aware of it.

Now, imagine your lungs. See them as they fill up with air...as they let the air out (5-second pause). Now, experience and be aware of your breathing, hear your breathing. Be aware of the people around you. Hear the sounds around you (5-second pause).

Now, at the count of three, you will be alert, completely awake. One, you're coming up (5-second pause). Two, becoming more and more alert (5-second pause). And three, your eyes are open. (Adapted from Wittmer & Myrick, 1980).

Session Two

Now that you are relaxed, and sitting in your chair, I want you to imagine that you are becoming very light. Your arms and legs are becoming as light as feathers and they begin to float upwards (5-second pause).

Now, you have become so light that your whole body begins to float from the chair (5-second pause). You are floating motionless in the air, above your chair (10-second pause). Imagine that you begin to float towards your classroom, taking the same way that you would if you were walking. As you float along, feel the cool breeze flowing past your body (5-second pause). You feel so good, so relaxed. What do you see along the way to your classroom? (20-second pause).

You enter your classroom, floating through the front door, and you float toward your desk (5-second pause). You reach your desk and are floating in the air beside your desk. You begin to gain weight again, and sink towards the floor. Stretch your legs out, so you can stand on the floor. Now that you are standing on the floor, sit down at your desk. Feel the seat against your back, your feet are flat on the floor, your arms are relaxed and your hands are in your lap (5-second pause). Now that you are in your seat, what do you see? (15-second pause). What do you hear? (15-second pause). How does it feel to be sitting in your classroom? Try to picture some of your friends in class (5-second pause).

What are they doing? What are they saying? (5-second pause) Now, imagine your teacher in front of the class (5-second pause). What is your teacher doing? (5-second pause). Now, imagine doing some kind of work at your desk (5-second pause). Imagine that you are working very hard at what you are doing, so hard that you tune everything else out (20-second pause). Excellent, you've done a good job.

Now, at the count of three, you will be alert, completely awake. One, you're coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open.

Session Three

Now that you are relaxed, imagine that you are back in your class sitting at your desk (5-second pause). What do you see, what do you hear? (5-second pause). How do you feel, being back in your class? Feel the chair against your back, your feet flat on the floor. Your hands are relaxed and in your lap. You sit there quietly and you feel relaxed. Imagine that in front of you, on your desk, is a sheet of paper and a pencil. Now, imagine that standing in front of the class is your teacher.

Picture your teacher for a few moments. Concentrate very hard on your teacher (5-second pause). Imagine that you are about to have a spelling test, and you are watching your teacher, waiting for the first word to be given. You are sitting there quietly, relaxed, and concentrating very hard on your teacher so that you will not miss the first word (10-second pause).

Now your teacher says the first word. What is it? Picture it in your mind, repeat it to yourself silently. Imagine that you pick up your pencil and begin to spell the first word at the top of the page (5-second pause). As you finish you look back at your teacher, because you don't want to miss the next word.

You sit there quietly, relaxed. You don't say a word, or speak to anyone else, you just concentrate on your teacher, waiting for the next word (5-second pause).

Imagine that your teacher says the next word. You begin to spell it on your paper (5-second pause). Imagine for a few more moments that this goes on, you sit quietly and relaxed, waiting for the next word, and when it is said, you spell it on your paper (30-second pause). Now the spelling test is over. Sit back and relax, you have done a fine job.

Now, at the count of three, you will be alert, completely awake. One, you're coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open now. You feel very relaxed and very good.

Session Four

Now that you are relaxed, I want you to imagine that you are back in your class (5-second pause). What do you see, what do you hear? What are the feelings you have from being in class? (5-second pause). Imagine that you are sitting in your seat. Feel the seat against your back. Your feet are flat on the floor. Your hands are in your lap. You sit there quietly, without saying a word, and you feel relaxed (5-second pause). Imagine that your teacher is passing out a math worksheet. You watch quietly as your teacher passes out the math sheets; now one comes to you. Take it and set it down on the desk in front of you. Look at the work sheet. The problems can be any kind of math problems you would like them to be. What are they? (5-second pause).

Now, imagine that your teacher is giving directions about the work sheet. You listen carefully, because you want to be sure to do everything just right. What is your teacher saying to you? (10-second pause). Once you are sure you understand the directions clearly, imagine that in front of you on your desk is a pencil. Pick it up and hold it in your hand. Begin doing the first math problem. Concentrate very hard, and be sure you do it just right (10-second pause). When you finish with the first problem, go on to the next (10-second pause).

Although you hear other sounds in the classroom, you tune them out. You ignore them, and continue working on your math problem (5-second pause). Although thoughts might come to your head which distract you, you tune them out also and continue working very hard (15-second pause). Concentrate very hard on the next problem (5-second pause). And the next (5-second pause).

Now, imagine that you finish the first page and you quickly turn to the next. Imagine you are working very hard to answer correctly as many problems as you can (20-second pause). Imagine that you are still working very hard, even if you are getting tired. Continue to do your very best to complete as many problems as you can (20-second pause). Now, imagine that you complete the last problem (5-second pause). Imagine that you feel very good, because you've done an excellent job.

Now, at the count of three, you will be alert, completely awake. One, you're coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open now.

Session Five

Now that you are relaxed, imagine that you are back in your room sitting at your desk (10-second pause). What do you see? (5-second pause). What do you hear? (5-second pause). Imagine that standing in front of the class is your teacher, who is talking to the entire class about something important. What is your teacher saying? (10-second pause). You don't want to miss a word your teacher says, so you concentrate very hard. To best be able to hear what your teacher says, imagine that you are sitting straight in your chair. Your feet are flat on the floor, and your hands are relaxed in your lap (5-second pause). Imagine that you lean forward in your seat so that you can better hear what your teacher says (5-second pause). Listen for a moment to what your teacher in your imagination is saying (15-second pause). Remember to keep your feet flat on the ground, and keep leaning slightly forward so that you can be sure to hear everything your teacher says (10-second pause). Now, imagine that your teacher begins to walk around while still talking to the class about something very important (5-second pause). Watch your teacher as your teacher moves and talks. Be very sure not to take your eyes away, and concentrate hard so you can hear everything your teacher says (15-second pause).

Although you may hear other classroom sounds, or other thoughts may try to enter your head to distract you, imagine that you tune them out, and continue concentrating very hard on your teacher (20-second pause). As your teacher moves and talks, you turn your head to follow (20-second pause). Remember to tune other sounds out, and concentrate only on your teacher (10-second pause).

Okay! The talk is now over, and you have done an excellent job listening to your teacher.

Now, at the count of three, you will be alert, completely awake. One, you're coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open now.

APPENDIX F
SCRIPTS FOR THE NONACADEMIC IMAGERY TAPES

Session One--The Creative Cave

Now, while you are relaxed, I want you to imagine that you see a beautiful field and you are walking barefoot across it toward a small woods off in the distance (5-second pause). As you approach the woods, you can see the leaves on the trees and you can feel the green velvety grass between your toes. There is a slight breeze...it brushes gently against your face (5-second pause). It's very pleasant. It feels so good to be close to nature. Walking on, you come to the top of a small hill on the edge of the woods, you are standing in this grass, the grass is very green, soft and velvety to your feet, delicate, very soft and very delicate. You can feel it as it touches your feet (5-second pause). You see beautiful flowers in bloom and smell their fragrances.

In front of you is a small mountain. As you gaze at the mountain, you see a small opening. The opening leads into a cave (5-second pause). As you enter the cave, you can see the rock formations, feel the moistness, and in the background you can hear the drip,

drip of water (5-second pause). The cave gradually leads down deeper into the ground. It is very quiet and peaceful here in the cave (5-second pause). As you make your way down deeper into the cave, relaxing more with every moment, every breath, every passing moment, relaxing more. It is so pleasant here. As you look toward the back of the cave, you notice a bright light coming from an area on the other side of this opening, at the back of the cave. You make your way through this opening, going into another section of the cave (5-second pause). It is light in this very beautiful area of the cave (5-second pause). There before you is a beautiful still pond. The water is so clear, so clear and quiet (5-second pause). It isn't moving at all. Its like a mirror and you can see the reflections of the rock formations around you in the water (5-second pause). As you stop beside the pond, you put your hand in the water...you can feel the water on your hand, it is so cool and feels so good on your hand (5-second pause). As you gaze into this beautiful, clear water, you see your own reflection becoming more clear now. Your own image becomes very clear. You see yourself smiling. You see what you are wearing. You see yourself very relaxed. Now you make your way back out of the cave, out into the sunlight (10-second pause).

Now, at the count of three you will be alert, completely awake. One, coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open. (Adapted from Wittmer & Myrick, 1980).

Session Two--Next to Nature

Close your eyes now. Try to relax, just let yourself go. Relax more with each breath. Let any noises you hear just fade away. Imagine that you are walking in a forest on a beautiful sunny day. See the trees. Look at them (5-second pause). There are light, fleecy clouds overhead. Watch them drift along lazily (5-second pause). You feel wonderfully free. As you walk along you notice flowers (5-second pause)...shrubs...trees...and you see the patterns of light as the sun shines down through the branches (5-second pause). You feel a slight breeze...it brushes against your face. You hear the sound of water bubbling over the rocks in a nearby small stream (10-second pause).

Now, picture yourself walking down this small path in the forest...as you follow a turn in the path, you come to a clearing, and in front of you is a small stream. There is a small canoe pulled up on the shore.

Begin walking toward the canoe. You step in, push off easily and effortlessly (10-second pause). There is a nice soft pillow there at one end of the canoe, and you lean back as the boat lazily drifts along (5-second pause). You notice the trees on the shore as they fade into the distance. You're drifting down the small stream (5-second pause). Lean back onto the soft cushion, just drifting now. Look up at the soft white clouds overhead. There, in the distance you can see and hear a tiny airplane and as you watch, the airplane emits white smoke and slowly spells out your name in giant letters across the sky (10-second pause).

Reach over the right side of the canoe. The water on that side is chilly. It's numbing (5-second pause). Put your other hand in the water of the other side of the canoe. On this side, the water is warm (5-second pause).

Now, at the count of three you will be alert, completely awake. One, coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open. (Adapted from Wittmer & Myrick, 1980).

Session Three--The Head Trip

Now, let your body relax. Just sort of sink down. Let your head go where it wants to go. With each and every breath, relax more and more. Let everything go from your mind; just let your mind go blank.

Imagine that your arms are like washcloths...very heavy and limp. Imagine that your legs are like pieces of wood. You feel heavy all over...as if you have a coat of armor on you. You are now sort of drifting, very vague, very loose, and very pleasant.

As you remain now in this relaxed state, use your imagination. Don't strain to hear my words...just follow them. First, imagine that you can see yourself as you are right now. Let yourself see you. Whether you are sitting or lying down, you are looking at you as you are right now...there with your eyes closed. See yourself as you are right now (5-second pause).

Now, see yourself very tiny. So small that you are less than an inch in height. You are very small...a very tiny you (5-second pause). See yourself now. The image becomes clear as you see yourself... less than an inch in height...very much alive, yet so small, so tiny. Now, that tiny you is walking into your mouth...walking into your mouth (5-second pause). As you stand there inside...it's kind of dark...a little wet. Looking around now, you look upward. There in the roof of your mouth a trap door is extending downward. You can see that it is well lighted in that part of your head. There is a small ladder leaning upward. Just remain relaxed.

Climb the ladder now. Climb the ladder and enter that part of your head. Let your imagination go now as to what you see (30-second pause). As you look toward the back of your head you see a small door that leads to another part of your head (5-second pause). Open the door. Enter, and close the door behind you. You can make out an image there in the dim light. That image is another you, but a different you...another self. How is the other self dressed? How does it look? Now, without saying anything out loud, talk to your other self. Carry on a conversation (30-second pause).

Now, you must make a decision. Will you bring your other self out with you, out into reality, or will you leave it where it is? You must decide now (30-second pause).

Now, at the count of three you will be alert, completely awake. One, coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open. (Adapted from Wittmer & Myrick, 1980).

Session Four--The New You

Let your whole body relax. Imagine yourself sinking down (5-second pause). Just let yourself go. Take a deep breath and listen to what I say. I am going to count from five down to zero and you will be able to see the numbers. With each number you become more and more relaxed...now, picture the number five, think about it, imagine that you are tracing it with your finger...now, you see the number four, it becomes more and more vivid...trace it. Picture the three, and you become more relaxed...two, you feel peaceful, content...one, just let yourself go ...now picture the zero and take another deep breath, letting it out slowly (5-second pause). Completely relaxed now, imagine the zero as being a magic carpet ...get on.

You are gliding peacefully and slowly...you feel the air brushing lightly against your face...you come to a forest where it is beautiful and you land there. Picture yourself going for a walk down a trail in the woods (10-second pause).

You see the trees...almost smell their fragrances ...Each tree becomes more and more vivid as you become more relaxed. As you walk along the path, think about how beautiful and peaceful it is...how good it is to be this close to nature...as you walk on, you can see the shadows cast on the ground below you...you can see the sun twinkling between the trees...feeling so close to nature makes you feel so relaxed...so peaceful.

As you walk on, you come to a clearing at the end of the trail. There before you is a beautiful, quiet pond. It's like a mirror and you can see the reflections of the trees in it. As you stop beside the pond and gaze into the water, you see your own reflection (5-second pause). The image becomes very clear...you see what you are wearing. You see you.

Imagine that this pond is magic...a place where you can get rid of anything about yourself you do not like...something that you dislike about yourself, something that you would like to change. Take a moment to decide what you wish to discard (5-second pause).

As you continue to gaze at your reflection in the pond, you see yourself as you are with this part of you that you wish to rid yourself of (5-second pause). The image is becoming clear...Then, someone drops a rock into the water and the ripples made by the rock wash away the old image...The unwanted part is being washed away in the water (5-second pause).

As the water stills again, you see your new image...You see yourself relaxed, smiling, cheerful, and enthusiastic about the image of you that you now see in the reflection (5-second pause).

Now, at the count of three you will be alert, completely awake. One, coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open. (Adapted from Wittmer & Myrick, 1980).

Session Five--The Seashore

I want you to imagine that you are at the seashore somewhere....What is your seashore like?....Walk around a bit (10-second pause). What is the beach under your feet like?....Reach down and touch the beach and get to know it better....Go down to the water's edge and feel the salt water....Walk along the shore and see what has drifted in on the tide (10-second pause). What can you smell?...What is the weather like?...How do you feel being there?...Explore your seashore on your own for awhile, and see what else you can discover (10-second pause).

Now I want you to look out at the ocean....What is the ocean like?...Look up and down the coast....Now look straight out to sea. Quite far out there is something gradually moving toward you, coming in with the waves. At first you will be uncertain about what it is and how large it is, but as it slowly comes closer you will be able to see what it is....Watch it closely as it comes closer and eventually comes up to the beach (5-second pause). When it does come in, go over to it and examine it carefully, and discover all you can about it....Walk around it and look at it from the other side....What is it like? (5-second pause). Touch it and see how it feels....Can you guess anything about its past and what events brought it to this beach?...How do you feel toward it?...

Now, I want you to become this object that came in to your beach. As this thing, what are you like? (10-second pause). How do you feel being this thing? ...What has happened to you that brought you to this beach?...Take a little time to get even more into the experience of being this thing (10-second pause).

Now become yourself again, and look again at this object on your beach...Do you see anything that you didn't notice before?...How do you feel towards this thing now? ...Take a last look around at your seashore...and notice if anything else has changed (10-second pause). ...Now slowly say goodbye to your seashore..and to whatever came in on your beach...and return to your existence in this room. Just stay quietly with your experience for a little while....

Now, at the count of three you will be alert, completely awake. One, coming up (5-second pause). Two, becoming more and more alert (5-second pause). And, three, your eyes are open. (Adapted from Stevens, 1971).

APPENDIX G
THE MARATHON MATH ACTIVITY BOOKLET

2	3	7	9	2	0
+6	+1	+7	+5	+8	+3

My Name: ______________________________

(Adapted from Edenfield, 1979)

Page 1

Row 1	2 +6	3 +1	7 +7	9 +5	2 +8	0 +3	4 +5	2 +7	9 +1	8 +3
Row 2	1 +9	1 +3	4 +0	4 +4	4 +6	1 +8	7 +5	0 +4	1 +0	6 +5
Row 3	3 +7	3 +1	1 +8	4 +5	3 +2	9 +1	4 +8	5 +4	4 +6	9 +4
Row 4	6 +6	2 +5	9 +0	7 +6	8 +1	0 +5	0 +7	9 +0	6 +4	3 +6
Row 5	6 +5	9 +1	1 +9	9 +7	1 +0	0 +6	5 +1	4 +5	2 +4	9 +7
Row 6	0 +6	4 +0	4 +0	4 +2	6 +8	2 +0	2 +4	7 +7	6 +5	2 +4
Row 7	0 +5	9 +9	8 +4	8 +4	5 +5	8 +8	8 +6	3 +5	8 +7	1 +2
Row 8	3 +3	4 +3	7 +3	3 +2	0 +1	8 +9	8 +0	5 +9	7 +9	9 +5
Row 9	5 +9	8 +5	7 +1	0 +0	2 +7	0 +7	9 +2	5 +9	4 +9	5 +0
Row 10	5 +9	5 +1	5 +1	1 +7	6 +1	2 +5	7 +6	8 +8	3 +1	5 +9

Go to next page

Page 2

Row 1	7 +3	2 +0	7 +4	3 +1	0 +0	6 +7	0 +7	8 +6	4 +4	0 +3
Row 2	3 +8	7 +3	1 +8	9 +2	3 +4	7 +8	6 +9	0 +8	0 +5	3 +8
Row 3	8 +3	7 +3	8 +1	1 +9	9 +6	1 +3	9 +2	0 +4	0 +0	0 +2
Row 4	5 +0	5 +1	3 +9	8 +7	2 +6	2 +9	5 +6	5 +7	8 +6	9 +8
Row 5	9 +1	7 +1	6 +6	5 +0	8 +8	4 +8	2 +5	5 +1	8 +4	6 +9
Row 6	3 +3	7 +3	0 +9	4 +6	9 +0	5 +3	7 +1	7 +5	5 +5	8 +5
Row 7	8 +3	5 +1	7 +0	6 +8	7 +8	0 +3	5 +4	8 +2	7 +5	4 +0
Row 8	0 +5	3 +1	2 +7	0 +4	4 +0	5 +7	6 +5	4 +0	0 +3	5 +4
Row 9	2 +5	5 +9	8 +2	1 +1	6 +2	7 +3	9 +3	3 +5	2 +6	5 +4
Row 10	8 +0	6 +1	8 +8	6 +9	6 +2	9 +9	9 +4	2 +2	3 +4	6 +8

Go to next page

Page 3

Row 1	0 +5	9 +4	6 +4	5 +6	5 +6	5 +5	3 +8	5 +9	6 +6	5 +7
Row 2	8 +5	2 +4	2 +2	4 +3	9 +2	1 +5	4 +3	3 +4	1 +6	8 +1
Row 3	1 +3	5 +6	0 +6	6 +1	1 +6	9 +4	7 +0	4 +8	7 +0	3 +5
Row 4	1 +2	6 +7	0 +0	5 +7	1 +6	1 +6	1 +4	3 +8	9 +5	7 +7
Row 5	2 +5	9 +9	5 +5	3 +2	1 +1	0 +3	0 +0	9 +8	4 +3	1 +4
Row 6	1 +2	3 +1	8 +7	6 +0	5 +8	2 +7	2 +8	4 +7	3 +5	3 +5
Row 7	2 +0	8 +2	0 +1	6 +3	7 +0	0 +9	6 +6	1 +1	9 +0	3 +7
Row 8	4 +7	6 +3	7 +0	6 +8	1 +1	8 +1	3 +0	4 +6	4 +7	2 +8
Row 9	2 +2	4 +1	3 +5	1 +3	5 +0	9 +0	2 +5	3 +0	9 +4	1 +5
Row 10	4 +3	2 +2	6 +7	6 +8	3 +0	3 +4	4 +4	1 +2	2 +2	8 +3

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Page 4

Row 1	2 +6	3 +1	7 +7	9 +5	2 +8	0 +3	4 +5	2 +7	9 +1	8 +3
Row 2	1 +9	1 +3	4 +0	4 +4	4 +6	1 +8	7 +5	0 +4	1 +0	6 +5
Row 3	3 +7	3 +1	1 +8	4 +5	3 +2	9 +1	4 +8	5 +4	4 +6	9 +4
Row 4	6 +6	2 +5	9 +0	7 +6	8 +1	0 +5	0 +7	9 +0	6 +4	3 +6
Row 5	6 +5	9 +1	1 +9	9 +7	1 +0	0 +6	5 +1	4 +5	2 +4	9 +7
Row 6	0 +6	4 +0	4 +0	4 +2	6 +8	2 +0	2 +4	7 +7	6 +5	2 +4
Row 7	0 +5	9 +9	8 +4	8 +4	5 +5	8 +8	8 +6	3 +5	8 +7	1 +2
Row 8	3 +3	4 +3	7 +3	3 +2	0 +1	8 +9	8 +0	5 +9	7 +9	9 +5
Row 9	5 +9	8 +5	7 +1	0 +0	2 +7	0 +7	9 +2	5 +9	4 +9	5 +0
Row 10	5 +9	5 +1	5 +1	1 +7	6 +1	2 +5	7 +6	8 +8	3 +1	5 +9

Go to next page

Page 5

Row 1	7 +3	2 +0	7 +4	3 +1	0 +0	6 +7	0 +7	8 +6	4 +4	0 +3
Row 2	3 +8	7 +3	1 +8	9 +2	3 +4	7 +8	6 +9	0 +8	0 +5	3 +8
Row 3	8 +3	7 +3	8 +1	1 +9	9 +6	1 +3	9 +2	0 +4	0 +0	0 +2
Row 4	5 +0	5 +1	3 +9	8 +7	2 +6	2 +9	5 +6	5 +7	8 +6	9 +8
Row 5	9 +1	7 +1	6 +6	5 +0	8 +8	4 +8	2 +5	5 +1	8 +4	6 +9
Row 6	3 +3	7 +3	0 +9	4 +6	9 +0	5 +3	7 +1	7 +5	5 +5	8 +5
Row 7	8 +3	5 +1	7 +0	6 +8	7 +8	0 +3	5 +4	8 +2	7 +5	4 +0
Row 8	0 +5	3 +1	2 +7	0 +4	4 +0	5 +7	6 +5	4 +0	0 +3	5 +4
Row 9	2 +5	5 +9	8 +2	1 +1	6 +2	7 +3	9 +3	3 +5	2 +6	5 +4
Row 10	8 +0	6 +1	8 +8	6 +9	6 +2	9 +9	9 +4	2 +2	3 +4	6 +8

Go to next page

Page 6

Row	0	9	6	5	5	5	3	5	6	5
1	+5	+4	+4	+6	+6	+5	+8	+9	+6	+7
Row	8	2	2	4	9	1	4	3	1	8
2	+5	+4	+2	+3	+2	+5	+3	+4	+6	+1
Row	1	5	0	6	1	9	7	4	7	3
3	+3	+6	+6	+1	+6	+4	+0	+8	+0	+5
Row	1	6	0	5	1	1	1	3	9	7
4	+2	+7	+0	+7	+6	+6	+4	+8	+5	+7
Row	2	9	5	3	1	0	0	9	4	1
5	+5	+9	+5	+2	+1	+3	+0	+8	+3	+4
Row	1	3	8	6	5	2	2	4	3	3
6	+2	+1	+7	+0	+8	+7	+8	+7	+5	+5
Row	2	8	0	6	7	0	6	1	9	3
7	+0	+2	+1	+3	+0	+9	+6	+1	+0	+7
Row	4	6	7	6	1	8	3	4	4	2
8	+7	+3	+0	+8	+1	+1	+0	+6	+7	+8
Row	2	4	3	1	5	9	2	3	9	1
9	+2	+1	+5	+3	+0	+0	+5	+0	+4	+5
Row	4	2	6	6	3	3	4	1	2	8
10	+3	+2	+7	+8	+0	+4	+4	+2	+2	+3

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Row 1	2 +6	3 +1	7 +7	9 +5	2 +8	0 +3	4 +5	2 +7	9 +1	8 +3
Row 2	1 +9	1 +3	4 +0	4 +4	4 +6	1 +8	7 +5	0 +4	1 +0	6 +5
Row 3	3 +7	3 +1	1 +8	4 +5	3 +2	9 +1	4 +8	5 +4	4 +6	9 +4
Row 4	6 +6	2 +5	9 +0	7 +6	8 +1	0 +5	0 +7	9 +0	6 +4	3 +6
Row 5	6 +5	9 +1	1 +9	9 +7	1 +0	0 +6	5 +1	4 +5	2 +4	9 +7
Row 6	0 +6	4 +0	4 +0	4 +2	6 +8	2 +0	2 +4	7 +7	6 +5	2 +4
Row 7	0 +5	9 +9	8 +4	8 +4	5 +5	8 +8	8 +6	3 +5	8 +7	1 +2
Row 8	3 +3	4 +3	7 +3	3 +2	0 +1	8 +9	8 +0	5 +9	7 +9	9 +5
Row 9	5 +9	8 +5	7 +1	0 +0	2 +7	0 +7	9 +2	5 +9	4 +9	5 +0
Row 10	5 +9	5 +1	5 +1	1 +7	6 +1	2 +5	7 +6	8 +8	3 +1	5 +9

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Row 1	7 +3	2 +0	7 +4	3 +1	0 +0	6 +7	0 +7	8 +6	4 +4	0 +3
Row 2	3 +8	7 +3	1 +8	9 +2	3 +4	7 +8	6 +9	0 +8	0 +5	3 +8
Row 3	8 +3	7 +3	8 +1	1 +9	9 +6	1 +3	9 +2	0 +4	0 +0	0 +2
Row 4	5 +0	5 +1	3 +9	8 +7	2 +6	2 +9	5 +6	5 +7	8 +6	9 +8
Row 5	9 +1	7 +1	6 +6	5 +0	8 +8	4 +8	2 +5	5 +1	8 +4	6 +9
Row 6	3 +3	7 +3	0 +9	4 +6	9 +0	5 +3	7 +1	7 +5	5 +5	8 +5
Row 7	8 +3	5 +1	7 +0	6 +8	7 +8	0 +3	5 +4	8 +2	7 +5	4 +0
Row 8	0 +5	3 +1	2 +7	0 +4	4 +0	5 +7	6 +5	4 +0	0 +3	5 +4
Row 9	2 +5	5 +9	8 +2	1 +1	6 +2	7 +3	9 +3	3 +5	2 +6	5 +4
Row 10	8 +0	6 +1	8 +8	6 +9	6 +2	9 +9	9 +4	2 +2	3 +4	6 +8

Go to next page

Row	0	9	6	5	5	5	3	5	6	5
1	+5	+4	+4	+6	+6	+5	+8	+9	+6	+7
Row	8	2	2	4	9	1	4	3	1	8
2	+5	+4	+2	+3	+2	+5	+3	+4	+6	+1
Row	1	5	0	6	1	9	7	4	7	3
3	+3	+6	+6	+1	+6	+4	+0	+8	+0	+5
Row	1	6	0	5	1	1	1	3	9	7
4	+2	+7	+0	+7	+6	+6	+4	+8	+5	+7
Row	2	9	5	3	1	0	0	9	4	1
5	+5	+9	+5	+2	+1	+3	+0	+8	+3	+4
Row	1	3	8	6	5	2	2	4	3	3
6	+2	+1	+7	+0	+8	+7	+8	+7	+5	+5
Row	2	8	0	6	7	0	6	1	9	3
7	+0	+2	+1	+3	+0	+9	+6	+1	+0	+7
Row	4	6	7	6	1	8	3	4	4	2
8	+7	+3	+0	+8	+1	+1	+0	+6	+7	+8
Row	2	4	3	1	5	9	2	3	9	1
9	+2	+1	+5	+3	+0	+0	+5	+0	+4	+5
Row	4	2	6	6	3	3	4	1	2	8
10	+3	+2	+7	+8	+0	+4	+4	+2	+2	+3

Go to next page

Page 10

Row 1	2 +6	3 +1	7 +7	9 +5	2 +8	0 +3	4 +5	2 +7	9 +1	8 +3
Row 2	1 +9	1 +3	4 +0	4 +4	4 +6	1 +8	7 +5	0 +4	1 +0	6 +5
Row 3	3 +7	3 +1	1 +8	4 +5	3 +2	9 +1	4 +8	5 +4	4 +6	9 +4
Row 4	6 +6	2 +5	9 +0	7 +6	8 +1	0 +5	0 +7	9 +0	6 +4	3 +6
Row 5	6 +5	9 +1	1 +9	9 +7	1 +0	0 +6	5 +1	4 +5	2 +4	9 +7
Row 6	0 +6	4 +0	4 +0	4 +2	6 +8	2 +0	2 +4	7 +7	6 +5	2 +4
Row 7	0 +5	9 +9	8 +4	8 +4	5 +5	8 +8	8 +6	3 +5	8 +7	1 +2
Row 8	3 +3	4 +3	7 +3	3 +2	0 +1	8 +9	8 +0	5 +9	7 +9	9 +5
Row 9	5 +9	8 +5	7 +1	0 +0	2 +7	0 +7	9 +2	5 +9	4 +9	5 +0
Row 10	5 +9	5 +1	5 +1	1 +7	6 +1	2 +5	7 +6	8 +8	3 +1	5 +9

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Row 1	7 +3	2 +0	7 +4	3 +1	0 +0	6 +7	0 +7	8 +6	4 +4	0 +3
Row 2	3 +8	7 +3	1 +8	9 +2	3 +4	7 +8	6 +9	0 +8	0 +5	3 +8
Row 3	8 +3	7 +3	8 +1	1 +9	9 +6	1 +3	9 +2	0 +4	0 +0	0 +2
Row 4	5 +0	5 +1	3 +9	8 +7	2 +6	2 +9	5 +6	5 +7	8 +6	9 +8
Row 5	9 +1	7 +1	6 +6	5 +0	8 +8	4 +8	2 +5	5 +1	8 +4	6 +9
Row 6	3 +3	7 +3	0 +9	4 +6	9 +0	5 +3	7 +1	7 +5	5 +5	8 +5
Row 7	8 +3	5 +1	7 +0	6 +8	7 +8	0 +3	5 +4	8 +2	7 +5	4 +0
Row 8	0 +5	3 +1	2 +7	0 +4	4 +0	5 +7	6 +5	4 +0	0 +3	5 +4
Row 9	2 +5	5 +9	8 +2	1 +1	6 +2	7 +3	9 +3	3 +5	2 +6	5 +4
Row 10	8 +0	6 +1	8 +8	6 +9	6 +2	9 +9	9 +4	2 +2	3 +4	6 +8

Go to next page

Page 12

Row 1	0 +5	9 +4	6 +4	5 +6	5 +6	5 +5	3 +8	5 +9	6 +6	5 +7
Row 2	8 +5	2 +4	2 +2	4 +3	9 +2	1 +5	4 +3	3 +4	1 +6	8 +1
Row 3	1 +3	5 +6	0 +6	6 +1	1 +6	9 +4	7 +0	4 +8	7 +0	3 +5
Row 4	1 +2	6 +7	0 +0	5 +7	1 +6	1 +6	1 +4	3 +8	9 +5	7 +7
Row 5	2 +5	9 +9	5 +5	3 +2	1 +1	0 +3	0 +0	9 +8	4 +3	1 +4
Row 6	1 +2	3 +1	8 +7	6 +0	5 +8	2 +7	2 +8	4 +7	3 +5	3 +5
Row 7	2 +0	8 +2	0 +1	6 +3	7 +0	0 +9	6 +6	1 +1	9 +0	3 +7
Row 8	4 +7	6 +3	7 +0	6 +8	1 +1	8 +1	3 +0	4 +6	4 +7	2 +8
Row 9	2 +2	4 +1	3 +5	1 +3	5 +0	9 +0	2 +5	3 +0	9 +4	1 +5
Row 10	4 +3	2 +2	6 +7	6 +8	3 +0	3 +4	4 +4	1 +2	2 +2	8 +3

APPENDIX H
INSTRUCTIONS FOR THE ADMINISTRATION OF THE MARATHON MATH ACTIVITY (MMA) PRETEST AND POSTTEST

Script of Instructions

Listen carefully to the directions for the activity you are about to do. This activity is not for a class grade, but you will have a chance to find out how well you have done later.

Please do not open your activity booklets until you are told to do so!

Now, I would like you to print your first and last name, very neatly, on the line that says "My Name." After your name, write your age.

The name of this activity is "The Marathon Math Activity." Your assignment will be to continue to answer correctly as many arithmetic problems as you can, until you are told to stop working.

In a moment, when you are told to begin working, open your activity booklets to the first page, and begin answering the problems on the first row. Answer each problem correctly before going on to the next problem. When you have completed all of the rows of problems on a page, you can go on to the next page.

If your pencil point breaks, raise your hand, and I will bring you another pencil.

Remember, your assignment is to answer correctly as many of the problems as you can. Do not skip any problems, and do not turn back to pages that you have already completed.

Okay, you may BEGIN WORKING!

(Pause exactly 15 minutes.)

STOP WORKING! Close your activity booklets and put your pencils down.

(Adapted from Edenfield, 1979.)

APPENDIX I
SUBJECT QUESTIONNAIRE

1. Did you enjoy listening to the tapes?

   Yes No

2. Were you able to form the pictures in your head while listening to the tapes?

   Yes No

3. Do you feel that listening to the tapes helped you with your schoolwork?

   Yes No

4. Would you enjoy listening to more tapes like these?

   Yes No

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Antonio Lee Avila was born August 28, 1954, in Los Angeles, California. In 1963 he and his family moved to Gainesville, Florida, where he graduated from Gainesville High School in June, 1972. Subsequently, he entered the University of Florida and received a Bachelor of Arts in psychology with Honors in June, 1975. In August, 1976, he received a Master of Education in psychological foundations of education from the University of Florida.

Following graduation, Antonio was employed as a psychometrist for the Marion County, Florida, Public School System, where he remained for three years. He is presently a school psychologist for the Alachua County, Florida, Public School System.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality as a dissertation for the degree of Doctor of Philosophy.

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